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14. ABSTRACT

In 2012, USAFSAM Radiation Consulting and AFSEC personnel completed radiation contamination clearance surveys on 15 igloos located at Lackland AFB Medina Annex. All results were found to be below applicable action levels. This letter serves as the final radiological report for applicable structures so final disposition and permitting issues of these buildings can be determined by AFSEC.

15. SUBJECT TERMS
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DEPARTMENT OF THE AIR FORCE
USAF SCHOOL OF AEROSPACE MEDICINE (AFMC)
WRIGHT-PATTERSON AFB OH

13 November 2013

MEMORANDUM FOR 37 CES/CEAN
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SUBJECT: Consultative Letter AFRL-SA-WP-CL-2013-0021, Weapons Storage Area Survey of Munitions Storage Igloos at Medina Annex, San Antonio, Texas

1. INTRODUCTION:

a. *Purpose:* The United States Air Force School of Aerospace Medicine, Occupational and Environmental Health Department, Radiation Health Consulting Branch (USAFSAM/OECM), in consultation with 802 CES/CEP and assistance from the AF Safety Center (AFSEC), performed radiological surveys in munitions storage igloos in the Medina Annex to Joint Base San Antonio (JBSA). The igloos and other buildings are contained on a 91B Material Permit, issued by HQ AFSEC to the 502 Air Base Wing (ABW) in 2005. Based on the formation of JBSA, the commander of the 502 ABW is also commander of the Joint-Base. The surveys were designed to assess the existence and levels of residual radiological contamination and the necessity for continued control under a 91B Material Permit. Removal of a structure from a permit allows it to be used for other purposes or demolition.

b. *Scope:* Fifteen structures were evaluated during this effort. One was an A-structure, while the other 14 were storage igloos. A brief description of the site history is found in Attachment 1, which contains details on the use of individual structure types. Based on past activities conducted in the structures, the greatest potential for contamination is expected to have been initially deposited on floor surfaces, with any long-term retention on the same surface and only minor redistribution to walled surfaces. Hence, surveys were designed initially to assess potential residual contamination in floor debris and in the surface of concrete floors. Without a finding of significant residual contamination on floors in a building, surfaces of walls were not planned for survey. Three separate methods were incorporated for assessment of residual surface contamination. First, prior to measurement surveys, the floors in each building were swept. Debris was collected and retained for analysis. Subsequent to this, surveys were accomplished to assess total and removable radiological contamination on floor surfaces. The term “total

radiological contamination" refers to the sum of any fixed and removable contamination. Attachment 2 contains a description of the radiological contaminants of concern. Highly enriched uranium (HEU) and depleted uranium (DU) were the most likely radiological contaminants to be found if residual contaminants existed, with a much smaller probability to find weapons grade plutonium (WGP). For this survey, acceptable contamination levels from the Atomic Energy Commission (AEC) Regulatory Guide 1.86, as modified and contained in Air Force Instruction (AFI) 48-148, were used. These have been used for clearance of previously evaluated structures on the Medina Annex and other former AF installations with former nuclear weapons activities. A copy of the Regulatory Guide, as excerpted from AFI 48-148, is contained in Attachment 3 with other pertinent regulatory issues.

c. *Survey Personnel:*

(1) Health Physicist, Air Force Safety Center
(2) Health Physicist, USAFSAM
(3) Two Health Physics Technicians, USAFSAM

d. *Survey Equipment:*

(1) Ludlum 2224-1 meter (SN# 127836) with Model 43-37-1 (SN#143637) gas proportional detector
(2) Two Ludlum 2360 meters (SN# 278626, 281540) with Model 43-89 dual phosphor scintillator probes (SN# PR311680, PR311679)

2. METHODOLOGY:

a. *Survey Site Preparation:* Buildings were ventilated by opening the doors and running a large fan in the doorway for a number of hours prior to survey. Ventilation was provided to mitigate the influence of radon daughter products on the background count rates in the buildings. During a previous radiological survey of A-structures, buildings 402, 403, and 404, high background α- and β-radiation count rates were observed during in-situ surveys; because the count rates were somewhat uniform, these high count rates were attributed to radon daughters.

b. *Floor Debris*: Prior to scanning surveys, floor debris was removed by sweeping. Floor debris removal prior to scanning surveys was vital to the survey effort for the following reasons. First, detection of potential fixed WGP and HEU on floor surfaces is dependent primarily on detection of α-radiation, as neither of these has an abundant emission frequency of medium- to high-energy β-particles, and the α-particles are readily attenuated by thin layers of dirt, water, etc. Second, there is the likelihood that potential surface contamination could be seen in floor debris, as the surfaces of concrete floors are abraded by routine activities in a building. Lastly, as noted in Attachment 1, the 1963 nuclear weapons accident dispersed DU to surface soils in a large area surrounding igloo 572, and these soils may have migrated into the surveyed buildings over the decades. Floor debris sweepings were retained as samples and were screened by high-resolution γ-spectroscopy analysis by the USAFSAM Radioanalytical Laboratory. All radionuclides identified by the analytical software were reported.

c. *Scanning Surveys of Igloo Floors*: A Ludlum Model 2224-1 survey meter connected to a Ludlum Model 43-37-1 detector mounted in a Model 239-1F floor monitor cart was used to perform scanning surveys of the structure floors. The detector is responsive to α- and β-particle radiations, but has limited sensitivity to γ-radiation. The igloo floors had dimensions of approximately 26 feet wide by 82 feet long. The floor was split into 102 equally sized rectangular scanning cells (~ 21 ft^2, 1.9 m^2), with width approximately equal to that of the detector. The length of each rectangular cell was a little less than 14 feet, providing six cells along the long dimension of the shelter. Attachment 4 contains an overhead representation of the survey grid layout used. Each cell was scanned along its long axis with the floor monitor for a 30-second integration period. The integrated count for each cell was recorded for the α- and β-radiation channels, although operators were cognizant of the observed count rate during scanning to identify areas of potentially elevated contamination. The active area of the detector is about 17.3 inches by 5.25 inches (0.63 ft^2, 0.058 m^2 in area), encompassing an area about 3% of an individual cell.

d. *Scanning Surveys of the A-Structure:* Two Ludlum Model 2360 meters with Ludlum Model 43-89 probes were used to scan the floors of the A-structure, building 585. The relatively small size of the probe on this meter/probe combination compared to the floor monitor made it easier to scan the small rooms and hallways in this building. A diagram delineating survey cells established for this structure is contained in Attachment 5. Like the procedure adopted for the igloos, each survey cell had a 30-second integrated count, with a recording of α- and β-radiation response. The cells varied in area from about 9.2 ft^2 (0.85 m^2) to 28.25 ft^2 (2.6 m^2), although the largest cell area established for the bays, A – D, was 12.5 ft^2 (2.6 m^2). The three open floor drains also received scans. The drains in B and D bays had been previously grouted, the reason unknown.

e. *Swipes*: Removable contamination was assessed by swiping a representative location in each of the cells receiving a scan survey. In buildings 584, 586, 587, 595, 596, 597, 598, and 599, 102 swipes were taken. In building 585, 64 swipes were taken to include the hallway drain. In buildings 588, 589, 590, 1100, 1101, and 1102, 51 swipes were taken. Half the number of swipes were taken in these buildings because they were upwind and upgrade from the blast site and not as likely to contain contamination. Wipe samples were accomplished using Whatman #41 paper filter disks. The area wiped for each sample was approximately 300 cm^2, which is three times the area more traditionally assessed by this method. The larger area was chosen to achieve greater sensitivity for subsequent analyses. The filter papers were then counted by USAFSAM Radioanalytical Laboratory using a thin window gas proportional counter for gross α- and β-radiation. In total, 1,187 swipe samples were taken. Subsequent to gross α- and β-radiation evaluation, samples from individual shelters were composited into a single sample, dry-ashed, and analyzed for uranium α-spectroscopy.

f. *Soil Samples*: During the surveys, it was observed that the floors had a slight crown along the central long axis of the floors, with liquid drain channels formed into the concrete floor along both walls of the igloos. The igloos were designed with a natural slope in the drain channels to the front of the igloo. Fluids could flow freely along the channels through open pipes on the front of the igloos. While not part of the pre-survey planning, it was determined during the survey to composite a small amount of soil collected from the area on the outside of

the igloo, adjacent to the drain channel pipes. The composited sample from each igloo was screened by the USAFSAM Radioanalytical Laboratory using high-resolution γ-spectroscopy.

3. SURVEY RESULTS:

a. *In-Situ Scanning Measurements*:

(1) A-Structure, Building 585: Attachment 6 contains the results from the survey of building 585. Table 1 contains a summary of the in-situ scanning measurements with the Ludlum 43-89 scintillator system. Due to the variability in areas of the cell scanned, a separate calculation of the area-weighted mean is also listed. Little difference existed between the two sets of mean values.

Table 1. Summary of In-Situ Scanning Measurements in Building 585 for Concrete Areas (Counts per 1-Minute Scan)

Parameter	Mean (Area-Weighted)	Median	Standard Deviation	Maximum	Minimum
α-Radiation	5.62 (5.68)	5	2.93	14	1
β-Radiation	222.4 (228.8)	218	30.9	323	172

(2) Igloos, buildings 584, 586-590, 595-599, and 1100-1102: Attachment 4 contains in-situ measurement results from the floor surveys of 14 igloos. An arbitrary color-coded scheme for visual reference was applied to the integrated α- and β-radiation measurement data. Summary statistics of the measurements are listed in Table 2.

Table 2. Summary Statistics for Igloo Floor Surface In-Situ Floor Monitor Surveys

Igloo	α-Radiation (counts per 30 s)					β-Radiation (counts per 30 s)				
	μ	σ	%CV	Max	Min	μ	σ	%CV	Max	Min
584	5.54	2.23	40.2	12	1	212.1	24.1	11.3	286	171
586	3.40	1.88	55.2	9	0	215.6	21.2	9.8	260	170
587	2.72	1.58	58.0	7	0	194.2	21.5	11.1	267	159
588	3.96	1.95	49.3	11	1	225.8	19.3	8.5	276	150
589	3.32	1.87	56.4	10	0	200.5	17.6	8.8	255	163
590	3.84	2.34	60.8	11	0	190.4	17.4	9.1	245	152
595	3.34	1.86	55.8	9	0	216.2	26.0	12.0	285	159
596	4.41	2.85	64.4	21	0	182.1	16.6	9.1	218	139
597	4.10	2.28	55.7	12	0	196.7	22.0	11.2	259	105
598	3.54	2.53	71.4	15	0	197.4	21.4	10.8	279	146
599	3.52	1.52	43.2	7	0	214.5	17.1	8.0	255	170
1100	3.04	1.80	59.3	10	0	224.0	16.8	7.5	287	185
1101	3.66	1.91	52.3	8	0	191.8	20.5	10.7	248	145
1102	3.63	1.88	51.9	10	0	180.2	23.7	13.1	251	117
All	3.72	-	-	21	0	203.0	-	-	287	105

b. *Wipe Sampling Results*: Attachments 6 and 4, respectively, contain laboratory analysis results for wipe samples from the A-structure, building 585, and the igloos. Summary descriptive statistics for the laboratory data are in Table 3 in the form of activity concentration, based on a 300-cm^2 area used for wipe samples. The data in Attachments 4 and 6 are on an activity per sample basis. Overall, all wipe samples had α- and β-radiation activity concentrations below the most restrictive criterion of Regulatory Guide 1.86, 100 dpm/100 cm^2, applicable to transuranics.

Table 3. Summary Descriptive Statistics for Laboratory Analyses of Wipe Samples from A-Structure and Igloo Floors

Building No.	Activity Concentration (dpm/100 cm^2)						No. of Wipes
	α- Radiation			β-Radiation			
	μ	σ	Max	μ	σ	Max	
584[a]	0.28	0.45	4.44	0.53	0.43	2.96	102
585[a]	0.62	0.34	1.48	1.15	0.81	4.44	64
586[a]	0.20	0.15	0.81	0.56	0.44	2.22	102
587[a]	0.34	0.23	1.04	0.91	0.50	2.22	102
588	0.24	0.44	2.96	1.80	1.57	7.40	51
589	0.19	0.20	1.04	0.92	0.51	2.22	51
590	0.21	0.20	0.67	0.52	0.31	1.48	51
595[a]	0.26	0.20	0.89	0.85	0.57	2.96	102
596	0.19	0.33	2.96	0.36	0.37	2.22	102
597[a]	0.19	0.18	0.96	0.46	0.46	2.22	102
598[a]	0.16	0.19	0.74	0.55	0.54	2.22	102
599[a]	0.07	0.13	0.37	0.31	0.52	1.48	102
1100	0.20	0.16	0.59	0.95	0.58	2.96	51
1101	0.21	0.20	0.67	0.63	0.43	1.48	51
1102	0.44	0.46	2.96	0.92	0.57	2.22	51

[a]Igloos with composited wipes analyzed by isotopic uranium.

c. *Wipe Samples Isotopic Analyses*: For seven igloos, buildings 584, 586, 587, 595, 597, 598, and 599, and the A-structure, building 585, wipe samples were composited, ashed, underwent uranium extraction, and analyzed by α-spectroscopy. Attachment 4 contains a tabular listing of the results of analysis by individual isotope and total uranium. Attachment 7 contains the high-resolution γ-spectroscopy results. Although the laboratory reported all of the radionuclides identified by the software, the attachment only contains a summary of key radionuclides: ^{235}U, ^{234}Th, ^{234m}Pa, ^{241}Am, ^{228}Ac, ^{212}Pb, ^{208}Tl, ^{214}Pb, ^{214}Bi, ^{40}K, and ^{137}Cs.

4. DISCUSSION:

a. *In-Situ Scanning Measurements*:

(1) A-Structure, building 585: The maximum integrated α-radiation count was 14 counts from a survey cell in the long entrance hallway. Using the α-particle detection efficiency of 0.215 for the two Ludlum 2360 and 43-89 meter/detector sets, the average α-radiation concentration in this cell was 52.1 dpm/100 cm^2. The area-weighted mean surface concentration for the entire structure was 21.1 dpm/100 cm^2, 2.5-fold lower than that of the cell with the maximum. The survey cell containing the maximum integrated α-radiation count was not in one

of the bays where radioactive materials were stored and work was conducted. The other observed high count rates, 10 (2), 11, 12 (2), and 13 cpm, were distributed among the four bays, although only two of the six were in adjacent cells, Bay C. Nevertheless, all of the integrated counts were below the most restrictive criterion of Regulatory Guide 1.86, 100 dpm/100 cm^2, applicable to transuranics.

About two-thirds of the variability in the integrated α-radiation counts can be attributed to the random nature of radioactive decay, with a third from other sources. Figure 1 shows the α-radiation data against a Poisson distribution. The data set has greater contribution from low and high integrated counts than the Poisson distribution.

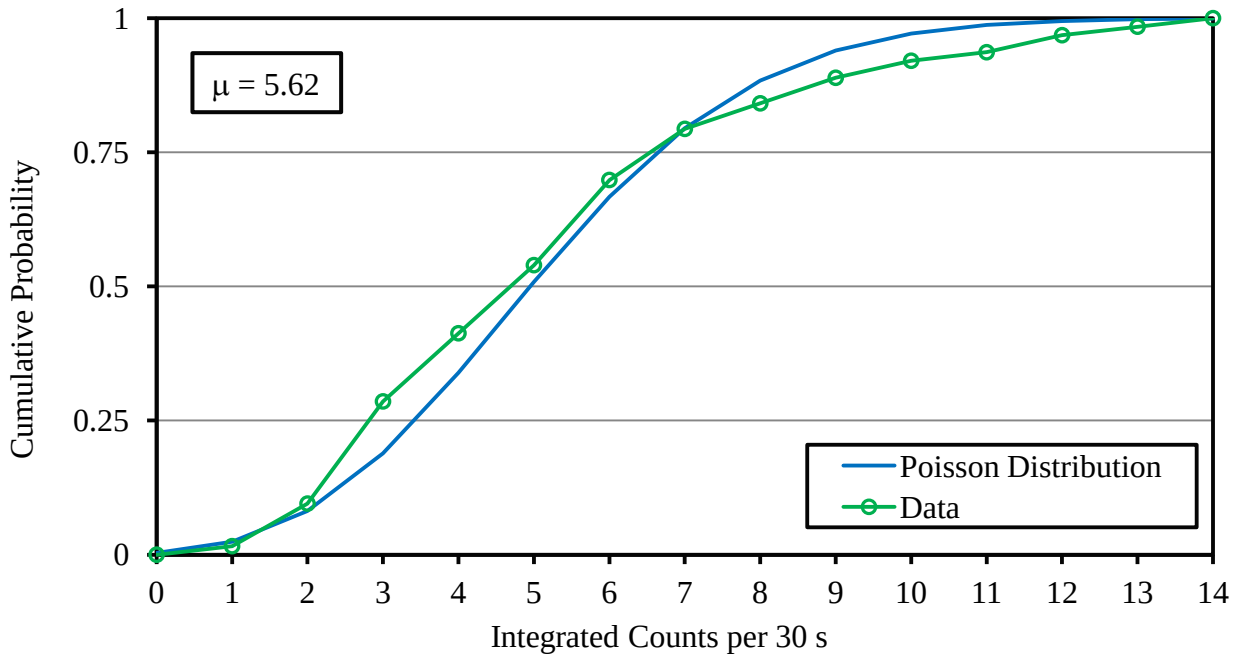

Figure 1. Cumulative Probability Distribution for Integrated α-Radiation Count Data for Building 585 with the Poisson Distribution for the Mean Integrated Counts for the Data

For the integrated β-radiation counts, only about 23% of the observed variability is attributed to the random nature of radioactive decay. Among the areas, the long entrance hallway had the highest mean integrated β-radiation counts, 279.9, and the three highest values observed among all survey cells. Since the hall would not have been used to store radioactive materials or perform work on the same items, the elevated count rates in this area do not appear consistent with past maintenance activities. Figure 2 is a regression plot of the α- to β-radiation counts. There is not a strong correlation between the two parameters. The slope of the regression line is positive, which is expected for many radiological contaminants, i.e., DU, and radon daughter products. In the absence of evidence of contamination from past operations, it is logical that the deposition of radon daughters on floor surfaces is responsible for some of the variability observed in excess of that attributable to the random nature of radiological decay. In comparison of the data from the survey of this building as compared to surveys conducted in similar A-structures, buildings 402, 403, and 404 from a previous USAFSAM survey effort at the Annex, the ventilation conducted prior to the survey was effective in greatly reducing the

influence of radon daughters on the measurements. Nevertheless, although the concrete used for construction of the buildings in the former weapons storage area would provide similar background α-radiation emission rates, as observed in a surface measurement, the area-weighted mean for this building was a little more than twice the mean among the 14 igloos also surveyed in this effort and about 45% higher than the igloo with the highest mean α-radiation counts. A-structures, due to their layout, are more difficult to ventilate radon gas than the igloo structures.

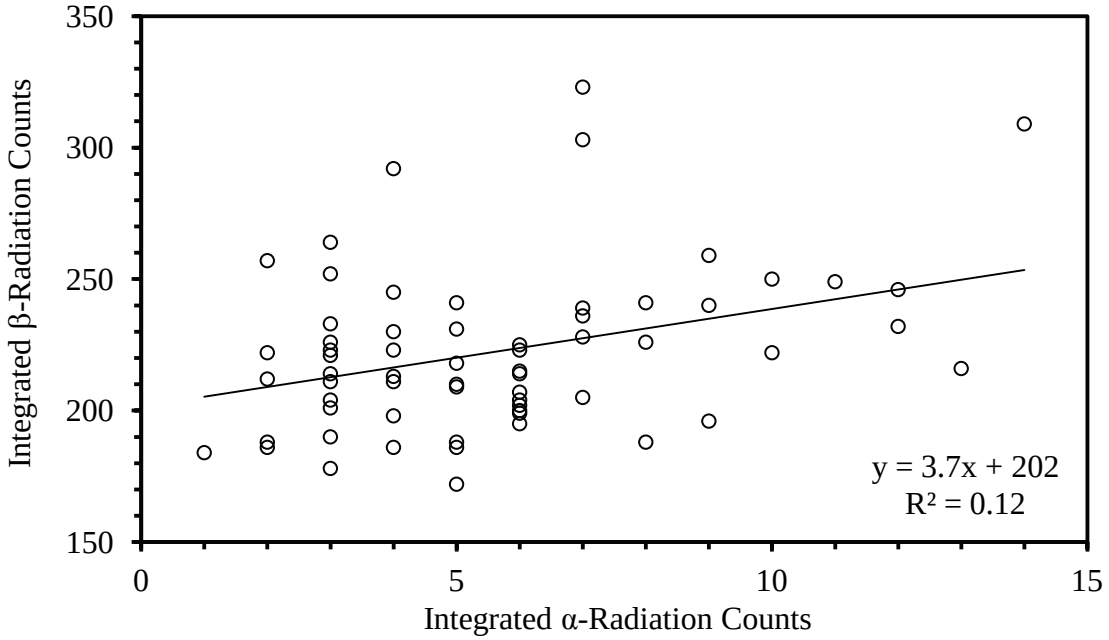

Figure 2. Regression of α- and β-Radiation Integrated Counts for Building 585, A-Structure

(2) Igloos, buildings 584, 586-590, 595-599, and 1100-1102: In general, none of the in-situ survey measurements had obvious indications of impact from past maintenance activities. For all of the igloos, except buildings 590, 596, and 598, the standard deviation of the integrated counts compared very closely to that expected for Poisson statistics for the mean of the distribution of integrated counts, i.e., $\sigma = \sqrt{\mu}$.

The distribution of integrated α-radiation counts within each igloo and the summary statistics in Table 2 were evaluated. The cumulative distribution for the integrated α-radiation count data from building 584 is displayed in Figure 3 along with a Poisson distribution, using the mean of the data set. The data closely follow a Poisson distribution, supporting the condition that the variability observed in α-radiation emissions among the measurement cells is dominated by the random nature of radioactive decay, rather than spatial differences in the distribution of radioactive α-radiation emitters on the surface of the concrete. Hence, the α-radiation monitoring data are not indicative of radiological contamination from past operations. Buildings 596 and 598 each had a couple of cells with integrated counts much higher than that expected for a Poisson distribution: 13 and 21 counts for building 596 and 13 and 15 counts for building 598.

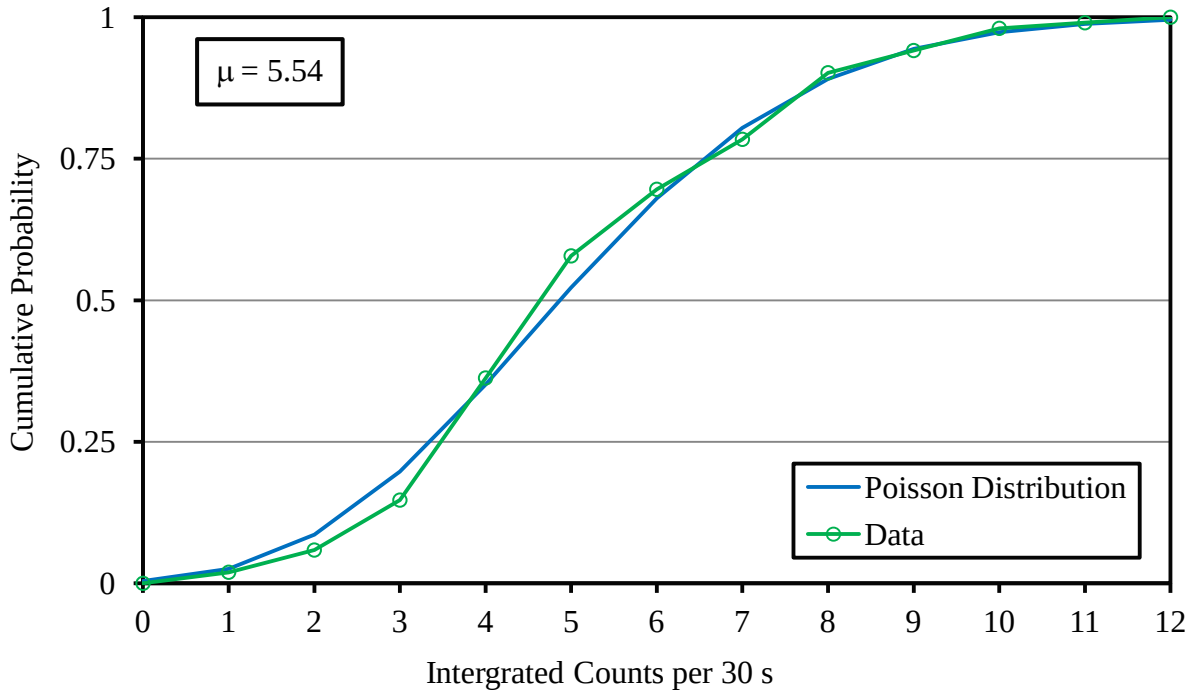

Figure 3. Cumulative Probability Distribution for Integrated α-Radiation Count Data for Building 584 with the Poisson Distribution for the Mean Integrated Counts for the Data

In building 596, the two cells are adjacent to each other in the center of the floor, while in building 598, the two cells are separated by one with an integrated count of 11. Without the high counts recorded in these cells, the distribution of integrated counts for both of these shelters more closely approximated a Poisson distribution. The respective area in each building is indicative of an non-uniform distribution of α-emitting surface activity, although areas of elevated activity concentration are fairly low. An integrated count of 21 per 30-second period equates to an average surface concentration in the subject cell of 55 dpm/100 cm^2, using a detector area of 584 cm^2, and a 4π detection efficiency of 0.13, as determined by calibration (Attachment 8). This level is below the most restrictive criterion of Regulatory Guide 1.86, 100 dpm/100 cm^2, applicable to transuranics. The criterion for uranium isotopes is 50-fold higher. Building 590 did not have any gross statistical outlier data points, but did have a number of cells with much higher than average integrated counts: two at 9, two at 10, and one at 11 counts. Although none of the five observed data points were gross statistical outliers, as the case for measurements recorded in buildings 596 and 598, the proximity of the five cells on the left side of the shelter is suspect and indicative of a non-uniform distribution of α-emitting surface activity. As for buildings 596 and 598, this is evidence that the surface of the floor was possibly impacted by radiological contamination from past operations, although the levels are well below the most conservative release criterion.

Overall, the average in-situ α-radiation levels in all of the igloos were fairly low, regardless of the possible radiological impacts from past operations. For the building with the highest, building 584, the average α–radiation surface concentration is only 14.6 dpm/100 cm^2, while the

average among igloos was only 9.8 dpm/100 cm^2. Building 584 had statistically higher α-radiation emissions from the floor surface than the other igloos, although there was no evidence of contamination in a discrete section of the building floor, which is a common characteristic of facilities impacted by radiological activities conducted within the building. Among the igloos, building 584 was the closest to the former location of building 572 that was involved in the 1963 explosion that dispersed natural and depleted uranium to surrounding land areas within and outside the weapons storage area (WSA). It is plausible that over the past 50 years the contaminated surface soils in the areas surrounding the shelter had some minor impact on radiological levels of dusts generated in this area that would naturally be seen on the floors of buildings. The levels of α-radiation emissions from the surface of the concrete floors in the igloos are similar to that assessed as the background level for concrete floors at the Boeing Michigan Aeronautical Research Center (BOMARC) missile accident site, McGuire AFB, NJ [1], where the estimate by regression analysis was 13.4 ± 1.8 dpm/100 cm^2.

The integrated β-radiation count data for the shelters do not have the same degree of sensitivity to residual uranium contamination as the α-radiation data due to the relatively high background count rate from penetrating radiations of terrestrial and cosmic origin. With the exception of buildings 596 and 599, the sides along the long axis of the igloos generally had greater integrated β-radiation counts than the center areas, based on visual inspection of the count data distributions. This subtle characteristic is attributed to measurement geometry. Floor areas along the sides of the igloos are in closer proximity to the concrete wall and ceiling, as compared to floor areas in the middle of the igloo. As such, they will have higher background photon interaction count rates from naturally occurring radioactive materials in the concrete. This characteristic, in part, explains why none of the igloos had the vast majority of variability in integrated counts attributable to the random nature of radioactive decay, under the assumption of background conditions. Building 1100 had the highest, at about 80%, while building 595 had the lowest, at about 32%. Buildings 596 and 599, in contrast, have areas in the middle of the long axis with generally higher integrated counts. Whether or not the elevated integrated counts in these areas compared to the integrated counts in the igloo in general are related to residual low-level surface contamination is not readily discernible from the data. Among the potential contaminants of concern, only depleted or natural uranium has an appreciable β-particle emission frequency in relation to the total α-particle emission frequency. However, for buildings 596 and 599, no clear relationship exists between α-radiation and β-radiation integrated count values based on a visual inspection of the data. Overall, the same can be observed by a regression analysis between the mean α- and β-radiation integrated counts for each shelter, as plotted in Figure 4. Clear from the regression analysis is a lack of correlation, with the squared correlation coefficient at 0.0041.

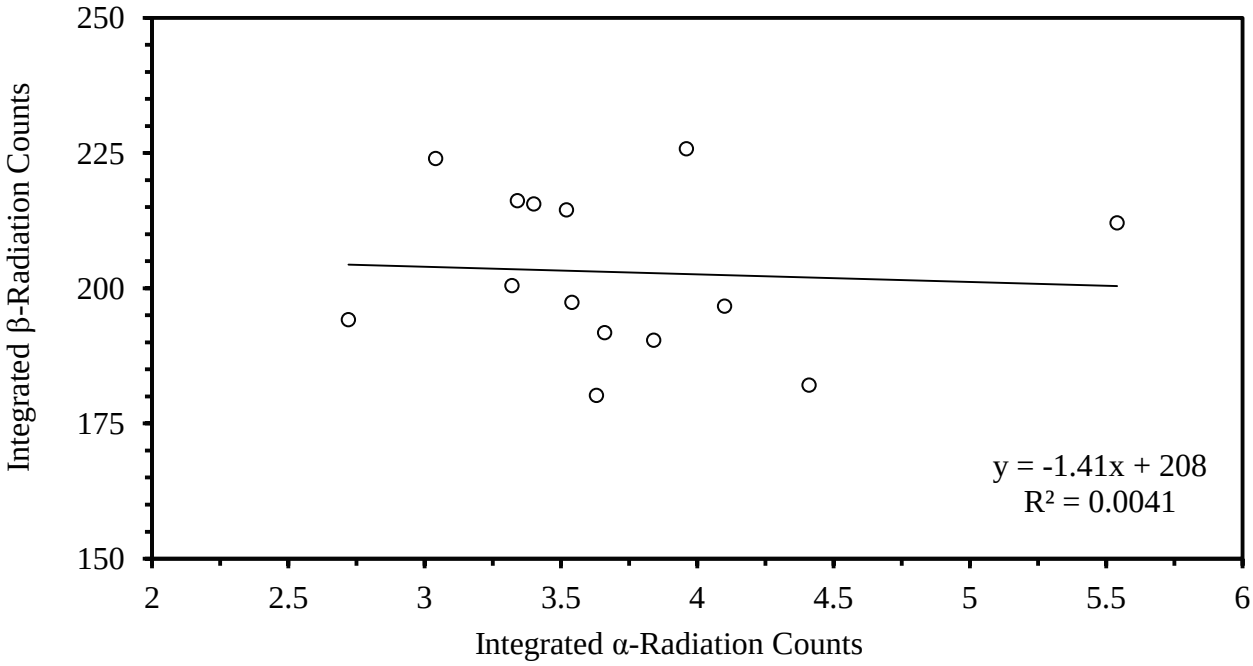

Figure 4. Regression of α- and β-Radiation Mean Integrated Counts for Igloos

b. *Wipe Sampling Results*: The highest α-radiation concentration among the wipes was 4.44 dpm/100 cm^2, building 584, while the wipe with the highest β-radiation concentration, 7.40 dpm/100 cm^2, was observed in building 588. Cells that contained wipes with the highest concentrations were reviewed for their comparable in-situ scanning measurements of either α- or β-radiation levels. No apparent correlation existed with surveys cells with high in-situ measurements. Building 585, the A-structure, had the highest mean α-radiation wipe concentration, 0.62 dpm/100 cm^2, while building 588 had the highest mean β-radiation wipe concentration, 1.80 dpm/100 cm^2.

Figures 5 and 6 contain regressions of β- to α-radiation activity on wipe samples, respectively, for buildings 585 and 588. Neither data set had a strong correlation between α- and β-radiation activity levels; however, this is reasonable due to low activity that existed on the wipes. A large fraction of the samples had reported levels of α-radiation, β-radiation, or both below the minimal detectable activity (MDA) for the method. The data for building 588 is better correlated than that for building 585 based on a comparison of the squared correlation coefficients and visual observation. In comparison of the mean α- and β-radiation activities among the shelters by regression analysis, a strong correlation did not exist, as illustrated by the plot in Figure 7. The mean removable α-radiation fraction was calculated for each shelter, based on the summary data compiled in Tables 2 and 3, and the weighed mean in-situ measurement for building 585 discussed above. Among the 15 buildings assessed in this survey effort, the removable α-radiation fraction ranged from 0.007 to 0.047, with a mean of 0.024 ± 0.03 and standard deviation of 0.011. This compares favorably with a regression analysis of removable contamination on concrete floors of missile shelters at the BOMARC site, 0.0240 ± 0.0018, that were impacted with WGP [1]. Inherent in Regulatory Guide 1.86 is the assumption of a removable fraction of 0.2, substantially higher than that demonstrated by the data.

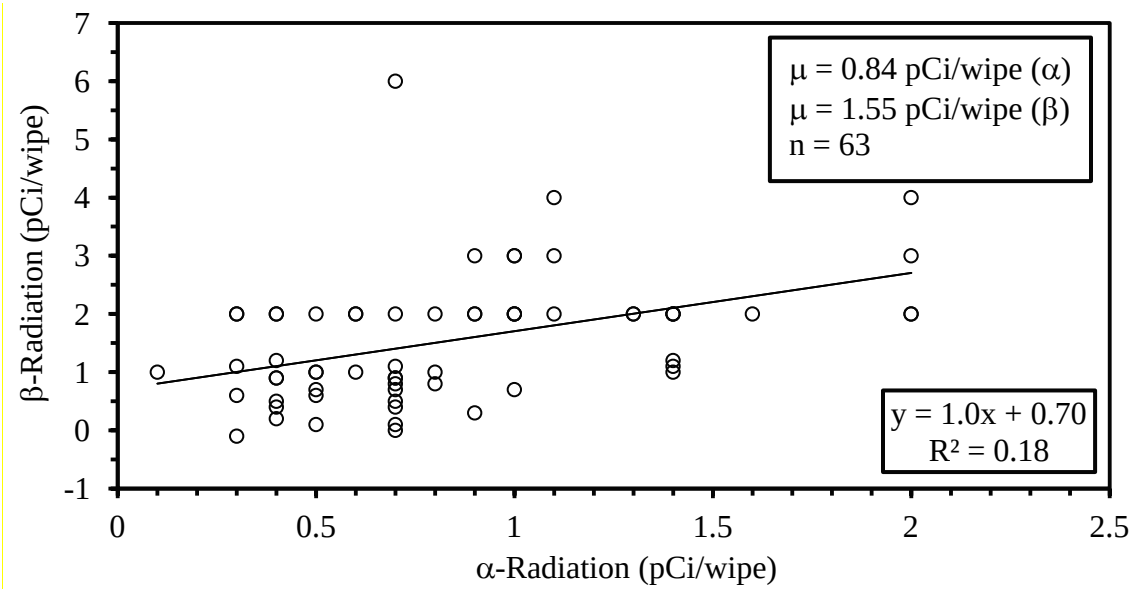

Figure 5. Regression of α- and β-Radiation Wipe Sample Results for Building 585

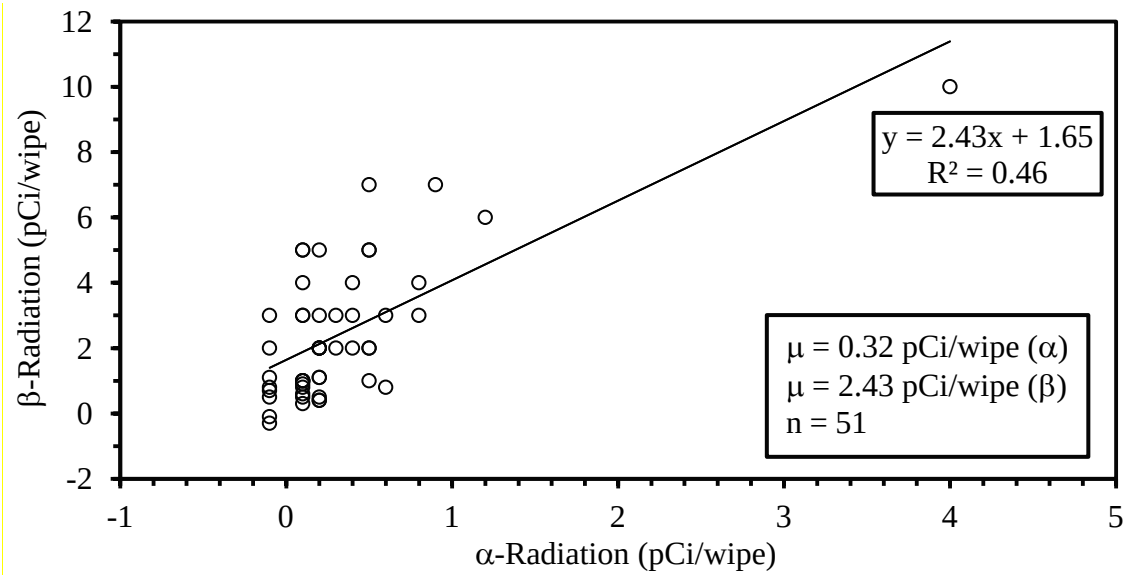

Figure 6. Regression of α- and β-Radiation Wipe Sample Results for Building 588

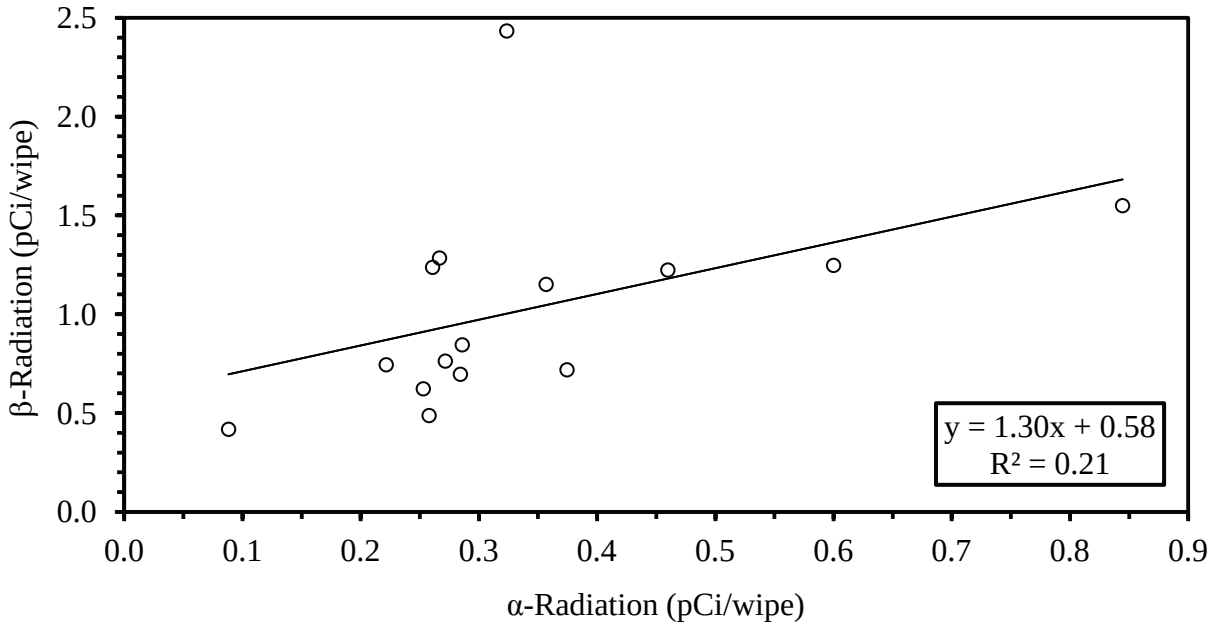

Figure 7. Regression of Mean α- and β-Radiation Wipe Sample Results for Buildings

c. *Soil Samples and Floor Debris Isotopic Analyses*: ^{234}Th is a short-lived progeny of ^{238}U, which is naturally occurring, but also used in nuclear weapons and associated with nuclear weapons maintenance activities. As well, as noted in Attachment 1, 14,000 pounds of DU and natural uranium were dispersed to surrounding areas in the 1963 accident that destroyed building 572. ^{238}U comprised over 99% of the release. ^{235}U is naturally occurring, but also exists in DU and HEU used in nuclear weapons, and was dispersed in the 1963 accident, but about 500-fold lower than the ^{238}U, on a mass basis. Among the others listed, all are naturally occurring except ^{241}Am and ^{137}Cs, which are typically found in the environment as residuals from atmospheric testing of nuclear weapons. Activity concentrations of ^{137}Cs in surface soils are normally much higher than the ^{241}Am. As noted in Attachment 2, ^{241}Am is a WGP co-contaminant and would have an expected presence if a sufficient amount of WGP was a residual on building floors. All reported ^{241}Am activity in soil and debris was identified at levels below the MDA. ^{137}Cs activity concentrations in soil and debris ranged from 0.074 ± 0.011 to 0.47 ± 0.06 pCi/g, with a mean of 0.20 pCi/g among the 28 samples with reported results. Based on the activity concentration range, however, the ^{137}Cs appears related to atmospheric nuclear weapons testing residuals.

With the exception of ^{235}U and short-lived progeny of ^{238}U, naturally occurring radioactive material constituents of floor debris and soil samples were in the range expected for surface soils. With the exception of building 596, ^{40}K activity concentrations were higher in the floor debris samples compared to the soil sample collected on the outside of each igloo. Due to the small mass of debris samples, high fractional uncertainty levels were observed in most ^{234}Th results for these samples, with the exception of the samples for buildings 589, 597, and 598. The ^{234}Th activity concentrations in these building were 2.7 ± 0.7 (building 589), 43 ± 11 (building 597), and 6.6 ± 1.1 (building 598) pCi/g. All of the point estimates of concentrations are in excess of typical background ^{238}U activity concentrations for soil in the region [2]. The point estimates of the ^{234}Th activity concentrations on the exterior of the igloos ranged from 2.55 ± 0.09 (building

1100) to 11.2 ± 1.0 (building 597) pCi/g. The concentrations are well within the range observed for soils in this area, as a result of the 1963 accident, and have ^{234}Th to ^{235}U activity concentration ratios characteristic of a predominating DU content. Natural uranium is expected to have a ^{234}Th to ^{235}U activity concentration ratio of 21.7, while the ratios ranged from 25 ± 9 to 120 ± 19, with a median of 45.5, among the 14 igloos. Therefore, due to the nature of contaminant in soils exterior to the igloos, it is not unreasonable for floor debris to have this characteristic as well, as floor debris can be formed by abrasion of the floor surface, dusts blown in by the wind, and dirt carried in by foot and vehicle traffic. All of these confound the assessment of radiological impacts from past operations.

A number of radionuclides were identified in the analytical reports that are neither expected to be in the environment nor related to historical operations. The radionuclides included ^{153}Gd (buildings 595 and 599), ^{154}Eu (building 596), ^{152}Eu (building 1101), and ^{60}Co (buildings 599 and 1101). All identifications were flagged as "consistent with false positive identification." Building 1102 had this flag for ^{239}Pu, a contaminant of concern. However, low activity concentrations of ^{239}Pu are difficult to directly assess through γ-spectroscopy analyses, which is the reason ^{241}Am activity concentrations are closely reviewed if WGP is a contaminant of concern.

5. CONCLUSIONS AND RECOMMENDATIONS:

a. All structures surveyed in this effort, 584, 585, 586, 587, 588, 589, 590, 595, 596, 597, 598, 599, 1100, 1101 and 1102, were found to be below the radiological release criteria of AEC Regulatory Guide 1.86.

b. All individual wipe samples and integrated in-situ measurements of floor surfaces had activity concentrations below the most restrictive criterion in Regulatory Guide 1.86. The most restrictive criterion is for transuranic surface contaminants. Isotopic-specific analyses of soils at the point on the exterior of shelter floor drains, floor debris, and composited wipe samples did not have evidence of WGP contamination. Under this circumstance, any surface contaminants from past activities would be appropriately evaluated against the less restrictive criterion in the guide for isotopes of uranium.

c. The results of the wipe sampling and in-situ measurements had evidence for some buildings that α- and β-radiation emission levels from the surface of the concrete were not uniform. In general, a uniformly poured concrete floor is expected to have reasonably uniform radiation emission levels. Inhomogenous radiation emission levels are indicative of potential contamination from past activities, as most potential contaminating mechanisms do not leave uniform surface contamination. It is clear from evaluation of floor debris samples that uranium contamination dispersed to areas inside and outside of the WSA from the 1963 accident likely contributed to uranium found in the debris. Also, some surface radiation emissions and contamination on wipe samples are likely attributable to contaminants from the 1963 accident, but there is no method to discriminate this from possible residuals from past maintenance activities if the contaminant was DU. The residual uranium identified in building 585 is attributable to past maintenance activities, as the 1963 accident did not disperse enriched uranium.

d. The venting activities performed on the one A-structure that was evaluated during this effort, building 585, were effective in reducing in-situ α-radiation levels, as compared to previous measurements that were conducted in buildings 402, 403, and 404. Future surveys of A-structures should vent in a similar manner prior to accomplishing in-situ measurements.

e. USAFSAM recommends that 37 CES/CEAN work with AFSEC/SEW on removing the structures/buildings surveyed in this letter from their permit.

6. REFERENCES:

Rademacher SE, Hubbell JL, Favret DJ. Boeing Michigan Aeronautical Research Center (BOMARC) missile shelters and bunkers scoping survey report. Brooks City-Case, TX: U.S. Air Force School of Aerospace Medicine; 2009 Jun. Special Report AFRL-SA-BR-SR-2009-0005.

Rademacher SE, Shaw DA, Renaghan BJ. Interim radiological scoping and characterization survey report, 1963 igloo 572 accident (former Medina Base), Lackland Training Annex, Lackland AFB, TX. Brooks Air Force Base, TX: Air Force Institute for Environment, Safety and Occupational Health Risk Analysis; 2002 Mar. Special Report IERA-SD-BR-SR-2002-0001.

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Chief, Radiation Health Consulting Branch

8 Attachments:
1. Site History
2. Contaminants of Concern
3. Regulatory Issues
4. Survey Results for Igloos (In-situ Meaurements and Swipes)
5. Survey Layout for Building 585, A-Structure
6. Survey Results for Building 585, A-Structure
7. Soil and Debris Analytical γ-Spectroscopy Results
8. Instrument Calibration Documents

cc:
AFSEC/SEWN (Attn: Dr. Rademacher)

Attachment 1
Site History

1. Constructed between 1953 and 1955, the Atomic Energy Commission (AEC) and the Armed Forces Special Weapons Project (AFSWP) started using Medina Base as a National Stockpile Site (NSS) in 1955. This site was 1 of 13 National and Operational Storage Sites (OSSS) for nuclear weapons. In addition to the stockpiling of weapons, periodic maintenance operations were conducted at the storage sites, including Medina Base. In 1959, the AEC expanded the mission at Medina Base to include weapons modification procedures and demilitarization, whereby the base was renamed the Medina Modification Center. The AEC mission at Medina Base ceased in 1966, with operations moving to the Pantex Plant, Amarillo, TX. Operations at Clarksville, TN, and Iowa Army Ammunitions Plant, which were similar to those conducted at Medina Base, were also consolidated at Pantex around the same time. Since then, the facility has been operated by the Air Force, with expansion to non-munitions over the interceding years.

2. Prior to 1966, the primary mission of the base was nuclear weapons stockpile surveillance; weapons modifications; retrofits; and weapons retirements on early, unsealed weapons systems. For stockpiled weapons, a majority of the workload was related to inspections of systems for corrosion and its removal and replacement of limited life components like batteries, tritium reservoirs, and neutron initiators. Demilitarization involved the dismantling of nuclear weapons with the disposition of radioactive and non-radioactive components and burning of the high explosives (HE) components. HE components were in contact with depleted uranium (DU) and would have dispersed this material to the environment in the burning process.

3. The Medina Base contained seven main types of structures: A-structures, C-structures, base spares warehouse, assembly/maintenance buildings, S-structures, storage igloos, and modification/disassembly plants. Structures on the Medina Base have similarities in design and construction to structures with similar purpose at other NSSs and OSSs.

a. A-structures. A-structures stored fissile special nuclear material (SNM) in “birdcages” that provided shielding of radiation emissions, limited oxidative corrosion of uranium metals, and maintained adequate spacing to reduce the risk of accidental criticality. These structures were built of thick, reinforced concrete walls, with a false single story aboveground facade. The interior space is divided into four single-entry rooms with a narrow bisecting corridor between pairs. Each room contained structural steel racks welded to meet special weapons storage standards. Vault doors controlled access to the interior corridor of each room. Each A-structure could store either 120 or 280 birdcages depending on the spacing of the racks. Birdcages remained sealed while stored in A-structures; therefore, no waste is believed to have been generated at these locations. The A-structures include buildings 301, 402, 403, 404, 552, 556, 562, 556, 571, and 585. Buildings 402, 403, and 404 were evaluated during a previous effort, while building 585 was subject to evaluation during this effort. Figure 1-1 contains a map of the area within the weapons storage area (WSA) containing building 585.

Figure 1-1. Map of Area Within WSA Containing Structures Subject to Survey

b. C-structures. C-structures were used to maintain the capsules stored in the A-structures. The capsules required periodic disassembly to verify the integrity of the fissile materials. This process generated a small amount of highly enriched and depleted uranium wastes. As of 1966, capsules were phased out and maintenance activities with nuclear materials ceased in C-structures. At these locations, weapons were stored and maintained within the structure. These structures were distinct in their appearance from the A-structures located at AEC locations. These structures were essentially an igloo with a vault inside. Fourteen igloo structures were evaluated during this survey effort: 584, 586-590, 595-599, and 1100-1102. None of the C-structures evaluated during this survey effort possessed interior vaults. It is unknown if these structures were used solely for storage purposes or if maintenance activities were conducted within them.

c. Gravel Gertie Cells. Three Gravel Gertie cells were built for modifying and disassembling weapons. The buildings possessed heavy blast doors and earth works that would have deflected the effects of an accidental explosion inward. On Medina, buildings 433, 440, and 441 were used for this purpose. Buildings 440 and 441 were evaluated in a previous effort. While these facilities were

not used for maintenance of nuclear components, weapons containing depleted uranium were handled in the facilities during high explosives removal operations or modifications. Immediately outside of the Gravel Gertie cells, each facility contained small bays in support of the operations.

d. Building 400 was used for the assembly and maintenance activities on non-nuclear equipment. Thus, the building was evaluated in a previous survey effort.

Attachment 2
Contaminants of Concern

1. General. Early nuclear weapons used polonium-beryllium (Po-Be) initiators to generate neutrons during the explosion sequence. Due to the 138-day half-life of ^{210}Po, these devices had to be replaced periodically. However, due to the short half-life, residuals would not be present today. During initiator replacement operations, fissile materials in the capsule was disassembled, inspected, and cleaned prior to reassembly with a new initiator. Plutonium components were encapsulated in a metal skin that limited the potential for loose radioactive material hazards to workers. However, due to the significantly lower radiotoxicity, highly enriched uranium (HEU) and depleted uranium (DU) parts were not encapsulated in inert metals and were subject to oxidation. While oxidized uranium parts were cleaned on tables prepared with butcher paper to contain oxidized uranium contamination, some potential existed for the spread of contamination to the facility. Floors would have had the greatest potential for contamination, if it was a residual contaminant. Between 1954 and 1957, Po-Be initiators were phased out of the stockpile, effectively limiting maintenance of capsules to an annual activity.

2. Accidents. Accidents involving nuclear weapons or their components were a source of potential contamination at installations outside the scope of routine maintenance and storage activities. In November 1963, an explosion involving 50,500 kg of chemical high explosives and a combination of natural uranium and DU in igloo 572 occurred. The result of the explosion was the complete destruction of the igloo and dispersal of its contents. The most highly concentrated residuals were located through surveys in a west to southwest direction from the igloo, although due to the amount of high explosives involved in the accident, surface soils in all directions around the detonation site are likely impacted to some degree. All of the facilities evaluated during this effort were in the vicinity of igloo 572 and are likely to have soils with discriminable impacts by the DU dispersed in this accident. Also, because floor debris is typically composed of exterior soils, materials stored in an igloo, and minor degradation of material comprising a structure (i.e., the concrete floors), residual contamination fixed to the floors or in removable debris could be from radioactive material released from this accident. Medina Base also received debris from nuclear weapons accidents that occurred at other locations. Most notable for Medina Base was debris from the 1960 nuclear weapons accident that occurred at the BOMARC Missile Site near McGuire AFB, NJ. This accident dispersed weapons grade plutonium, HEU, and DU.

3. Findings from Previous Surveys. The Air Force has conducted numerous surveys of nuclear weapons maintenance and storage facilities, as well as facilities and outdoor areas impacted by accidents. Surveys of building interiors used for nuclear weapons maintenance and storage were conducted on 16 other installations, encompassing 381 separate buildings after 1990. The majority of the surveys were accomplished by the Armstrong Laboratory, Brooks AFB, TX, and follow-on organizations, based on organizational restructuring. Among buildings evaluated at other installations, only three interior structures had evidence of interior radiological contamination: building 723 (Grissom AFB, IN), building 8531 (Carswell AFB, TX), and building 903 (Travis AFB, CA). Buildings 723 and 8531 had small areas of HEU contamination. In both cases, the contamination was apparently a mixture of 90%-plus HEU with DU and limited to 3 ft^3 in building 723 and 98 ft^3 in building 8531. The contamination in building 723 was attributed to the handling of

weapons that were involved in the 1964 nuclear weapons accident that occurred at Grissom AFB. The contamination at Travis AFB was attributed to a leaking neutron source.

4. Findings from Previous Surveys at Medina Annex. Screening surveys of floor surfaces in building 431E were conducted by USAFSAM in 2008 in support of impending self-help facility modifications. While floor scanning activities did not identify any inhomogeneities in detector response, α-spectroscopy analyses of four floor debris samples were indicative of total uranium activity concentrations more than 10-fold higher than that typical for soils in the San Antonio area and having an isotopic distribution typical of moderately depleted uranium. In a 2009 survey of other permitted structures on Medina Annex, there was evidence of elevated radiological levels on wipes collected in one area of the floor of building 402. However, concentrations were below criterion established for unrestricted release.

5. Uranium.

a. Physical. Uranium is a naturally occurring radioactive metal that is found in all rocks and soils, with concentrations in common rock ranging from 1 to 4 ppm. The isotopes of uranium in the natural environment are ^{234}U, ^{235}U, and ^{238}U. ^{234}U is a daughter in the decay chain of ^{238}U and is normally in equilibrium with its ^{238}U parent in soil matrices. By mass, 99.28% of natural uranium is ^{238}U, with the majority of the balance to ^{235}U. In a pure metallic state, it is silvery-white in appearance and has a density of 19 g/cm^3. In the environment, it occurs in a variety of minerals, but more commonly pitchblende and carnolite, where the uranium is in mostly uranium dioxide (UO_2) or trioxide (UO_3) chemical forms. Although these forms are relatively insoluble, surface and ground water contain low concentrations, and they are normally detectable in drinking water sources. As well, ambient concentrations exist in the air from the resuspension of dusts from soil and in foods.

b. Compositions. Figure 2-1 is a histogram of key isotopic mixtures of uranium by mass. The composition for DU is a moderately depleted composition. The exact composition of the DU used for any weapons component can be varied dependent on the depleted process stream. In the earlier days of the weapons program, there was some use of natural uranium metal, historically called Tuballoy. From the figure, moderately depleted uranium is similar to natural uranium, except that it has been stripped of about 70 and 80% of its ^{235}U and ^{234}U content, respectively. An example of 93.3% enriched uranium is provided as an example of HEU, although actual enrichment levels for specific weapons are classified. The remainder of the mass is ^{238}U, 5.6 %, and ^{234}U, 1.1%. Due to significant disparities in the radiological half-lives of the primary isotopes of uranium, there is a significant difference in the isotopic mixes from an activity basis, as illustrated in Figure 2-2. For the 93.3% HEU, 97% of the activity is from ^{234}U, with ^{235}U more than 30-fold lower. For natural uranium, most of the activity is split equally between ^{234}U and ^{238}U. These relationships are important to field sampling methodology selection and risk analyses.

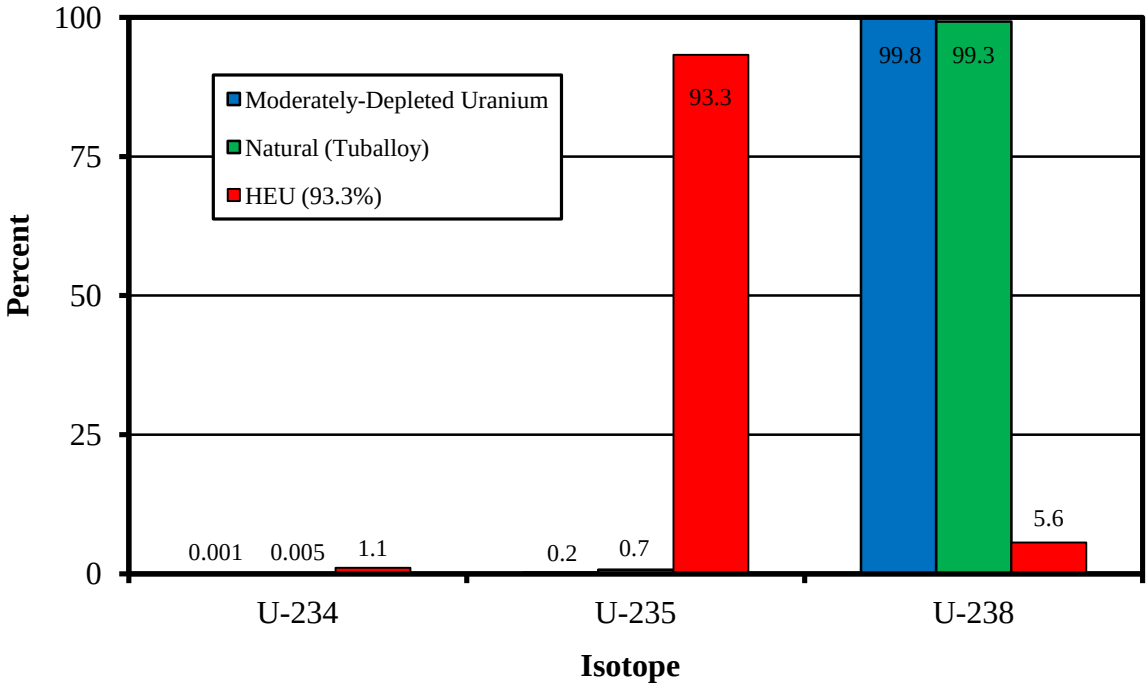

Figure 2-1. Composition of Key Uranium Types (by Mass) (Adapted from Rademacher, 2008)

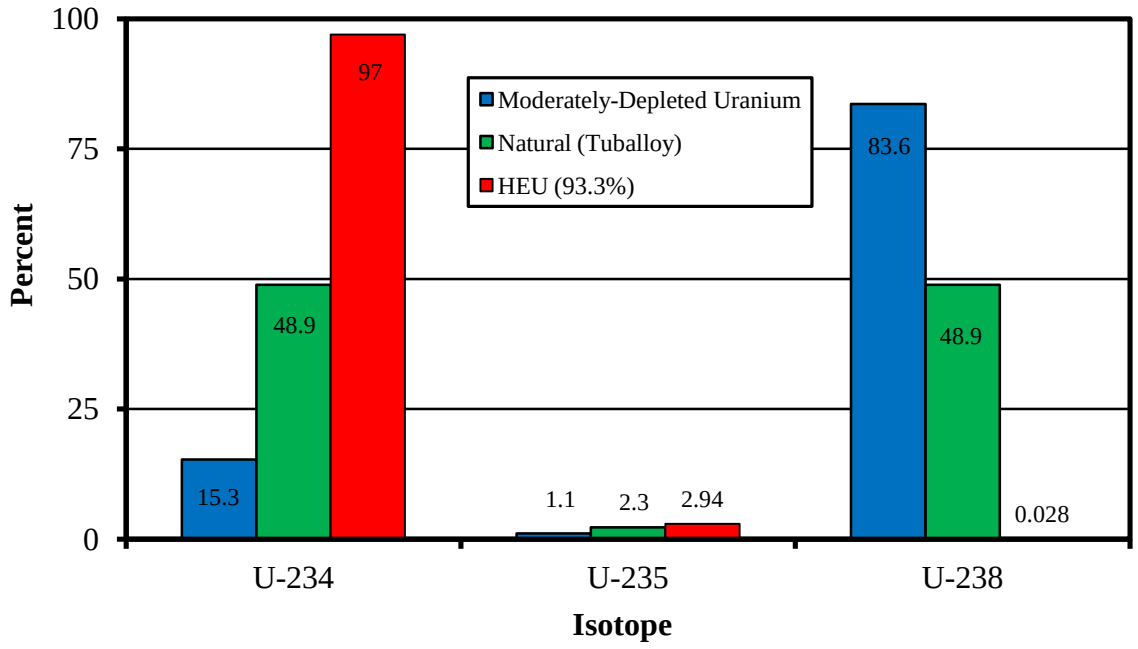

Figure 2-2. Composition of Key Uranium Types (by Activity) (Adapted from Rademacher, 2008)

c. Radiological Emissions. Table 2-1 contains a summary of radiation emissions from natural, moderately depleted, and highly enriched uranium. All three are normalized to the emission of a single α-particle, the decay mechanism for all three isotopes, and include the radiological emissions of short-lived radiological daughter products. DU and Tuballoy have a significant frequency of β-particle emissions and of energies for a reasonable fraction that have significant penetrability in materials. The 2.28 MeV_{Max} particle, emitted by ^{234m}Pa, is the highest energy β-particle emitted and provides the largest contribution to shallow dose (external) to tissues from unshielded DU or Tuballoy. None of the isotopic mixes have significant emission frequencies of x- and γ-rays (collectively termed photons) in comparison to α-particle emissions. As a contaminant deposited on a surface, screening surveys are often accomplished with portable instruments that are sensitive to α- and/or β-radiation emissions.

Table 2-1. Radiation Emissions from Various Isotopic Forms of Uranium

Activity Percents			α-emissions		β-emissions		Photons	
U-234	U-235	U-238	Energy (MeV)	Frequency	Energy (MeV)	Frequency	Energy (MeV)	Frequency
15.3	1.1	83.6	4.20	66%	2.28*	82%	0.0926	4.70%
Specific Activity =	4.0 E-07 Ci/g		4.15	18%	0.189	59%	0.0633	4.1%
			4.78	11%	0.096	22%	0.1857	0.6%
Moderately-Depleted Uranium			4.72	4.4%	0.076	2.4%	1.004	0.5%
			4.40	0.6%	0.287	0.5%	0.1128	0.2%
							Th,U, Pa x-rays	> 10 %
							Brems. x-rays*	variable
U-234	U-235	U-238	Energy (MeV)	Frequency	Energy (MeV)	Frequency	Energy (MeV)	Frequency
97	2.94	0.0275	4.78	69%	0.287	1.4%	0.1857	1.7%
Specific Activity =	6.9 E-05 Ci/g		4.72	28%	0.304	1.0%	0.0256	0.4%
			4.22	2.0%	0.205	0.4%	0.143	0.30%
Highly-Enriched Uranium (93.3 %)			4.40	1.7%			0.0915	0.30%
			Others	0.3%			Th,U, Pa x-rays	> 1%
U-234	U-235	U-238	Energy (MeV)	Frequency	Energy (MeV)	Frequency	Energy (MeV)	Frequency
48.9	2.3	48.9	4.20	39%	2.28*	48%	0.0926	2.7%
Specific Activity =	6.8E-07 Ci/g		4.78	35%	0.189	34%	0.0633	4.20%
			4.72	14%	0.096	13%	0.1857	1.30%
Natural Uranium Metal (Tuballoy)			4.15	10%	0.076	1.4%	0.0256	0.30%
			4.40	1.3%	0.287	1.1%	Th,U, Pa x-rays	> 7 %
			Others	0.7%	0.304	0.8%	Brems. x-rays*	variable
	β-Particles with energy too low for typical portable instrument detection							

6. Weapons Grade Plutonium (WGP). Components containing WGP that were maintained and stored by the Air Force and AEC at Medina were contained in sealed weapons systems that were encapsulated in a metal skin if part of early, unsealed weapons systems. The exception, as noted above, involved debris from nuclear weapons accidents or components that had degradation in the protective metal skins. Monitoring procedures existed to evaluate the integrity of the protection

provided by the skins. The protective skins were developed for the plutonium-bearing components in early, unsealed systems due to the greater radiotoxicity and substantially higher specific activity of plutonium compared to HEU or DU that is germane to internal exposures. WGP is composed primarily of ^{239}Pu, with lesser mass amounts of ^{238}Pu, ^{240}Pu, ^{241}Pu, and ^{242}Pu. For many nuclear weapons, individual WGP isotopic assay information exists, but is classified. Table 2-2 contains estimated composition of plutonium from the 1960 nuclear weapons accident that occurred at McGuire AFB, NJ. Table 2-3 contains a listing of radiological emissions for an isotopic composition of WGP from Table 2-1. WGP is difficult to quantify in field environments due the absence of high-energy photons with abundant emission frequency or β-particles detectable by portable field instruments. In laboratory and in-situ environmental measurements of WGP in soil, often measurement of the 0.060 MeV γ-ray from ^{241}Am is used as a surrogate for $^{239/240}$Pu. For measurement of potential surface contamination, surveys are reliant on detection of α-particle emissions, unless very high concentrations are present, making γ-radiation measurement techniques more plausible.

Table 2-2. Isotopic Composition of WGP Based on Los Alamos National Laboratory Estimates and Soil Analyses from Air Force Restoration Project*

Isotope (Decay Mode)	Radiological Half-Life (yr)	Estimate in 1958		Activity Fraction Estimate in 2005
		Mass Fraction	Activity Fraction	
Pu-238 (α)	87.74	0.000099	0.003	0.010
Pu-239 (α)	24,110	0.937	0.103	0.474
Pu-240 (α)	6,560	0.056	0.023	0.104
Pu-241 (β)	14.35	0.0047	0.871	0.413
Pu-242 (α)	376,000	negligible	negligible	negligible
Am-241 (α)	432	negligible	negligible	0.189**

*Table 13-3 from 91b Material Permit - Lackland Training Annex, Lackland AFB, TX. Permit #2005-91B-013, HQ AFSEC/SEWN issued to 502 Air Base Wing/CC, 2005.

**^{241}Am activity fraction is not included with Pu isotopes. The number represents emission ratio compared to the sum of Pu α-particle emitters.

Table 2-3. Radiation Emissions from WGP Based on Table 2-2 Isotopic Mixture [Normalized to Total α-Particle Activity]*

α-Emissions		β-Emissions		Photon Emissions	
Energy (MeV)	Frequency (%)	Energy (MeV)	Frequency (%)	Energy (MeV)	Frequency (%)
5.16	50	0.005	59	0.060 (γ)	5.7
5.49	13	Blank		0.014 (x)	10.4
5.17	11			Blank	
5.14	10				
5.11	8				
Others	8				

*91b Material Permit - Lackland Training Annex, Lackland AFB, TX. Permit #2005-91B-013, HQ AFSEC/SEWN issued to 502 Air Base Wing/CC, 2005.

7. Reference.

Rademacher SE. Technical guidebook to permitting, investigations, and remedial actions on Air Force section 91b radiological sites (second edition). Brooks City-Base, TX: Air Force Institute for Operational Health; 2008 Mar. Special Report IOH-SD-BR-SR-2007-0002. [Available to those with access.]

Attachment 3
Regulatory Issues

1. The radioactive materials associated with residual from nuclear weapons systems while in the custody of the Department of Defense are covered under Chapter 9, Section 91(b), of the Atomic Energy Act of 1954 (42 U.S.C. § 2011 *et seq.*), which, at the time of the Act, exempted these materials from regulation by the AEC. The part of the AEC that regulated most radioactive material used in the private sector and some of the Department of Defense was reestablished as the Nuclear Regulatory Commission (NRC) under the Energy Reorganization Act of 1974. Within the Air Force, oversight on the use of Section 91b materials is provided by the Weapons Safety Division, Air Force Safety Center (AFSEC/SEW), as provided for in AF Instruction 91-108, *Air Force Nuclear Weapons Intrinsic Radiation and 91(b) Radioactive Material Safety Program*, 21 Sep 10. The buildings that were covered by the survey effort described in this letter are under Permit #2005-91B-013, Amendment (2), 13 Oct 10.

2. Most previous AF nuclear munitions storage and maintenance structures were evaluated under the criteria in Regulatory Guide 1.86 (Table 3-1, below). Values from the guide are currently referenced by AF Instruction 48-148, *Ionizing Radiation Protection*, 21 Sep 11, with the addition of a criterion for tritium and tritiated compounds from 10 CFR 835, Appendix D. The NRC allows its licensees to use site-specific criteria that meet license termination criteria established in 10 CFR 20, Subpart E. The criteria in Regulatory Guide 1.86, generally, are more restrictive than site-specific criteria developed by computer-based, dose-modeling software for transuranic isotopes. For fixed contamination from uranium, the criterion specified in Regulatory Guide 1.86 is 5,000 dpm/100 cm^2. For removable uranium contamination, the criterion from Regulatory Guide 1.86 is 1,000 dpm/100 cm^2. Weapons grade plutonium (WGP) falls under the second row criteria of the table and is 50-fold lower than the criteria for uranium isotopes. While Section 91(b) materials are not subject to NRC rules, AFSEC/SEW commonly applies NRC-established standards to projects.

a. Strict application of the provisions of the Regulatory Guide are impractical for some surveys, and the area constraints placed on the criterion specified in the Guide have no tangible protective bases. For example, for the criterion in the first two columns, the average and maximum acceptable total surface contamination levels, it is generally accepted that 100% of potentially impacted areas will be assessed by survey measurements. However, for assessment of the removable portion, the criterion in the third column normally only involves sampling a small fraction of potentially impacted surfaces, which places a limit on the area to $\leq$ 100 cm^2. For the igloos surveyed in this effort, 19,741 wipe samples per igloo would be required if each encompassed 100 cm^2. For this survey, only 51 wipe samples were collected in some igloos. Each sample was from an area of 300 cm^2, three times that specified in the Guide as a maximum area, but a sampling of only about 0.8% of the total area for some igloos and 1.6% for the reamining. Although not noted in the Guide, it is generally accepted for characterization projects of this type that less than a percent of the potentially impacted area is sampled for removable surface contamination. Under this approach, wipes are used in conjunction with in-situ measurements to characterize the removable fraction, if sufficient levels of residual activity exist. Improved detection sensitivity is the reason for using a 300-cm^2 wipe area in lieu of the 100-cm^2 area specified in the Guide.

Table 3-1. AEC Regulatory Guide 1.86 (1974) Acceptable Surface Contamination Levels [bracketed portions of notes are extracted from AFI 48-148 and are not part of original]

Nuclide[a]	Acceptable Surface Contamination Levels (dpm/100 cm^2)		
	Average[b,c,d]	Maximum[b,d,e]	Removable[b,f]
U-nat, ^{235}U, ^{238}U, & associated decay products	5,000 (α)	15,000 (α)	1,000 (α)
Transuranics, ^{226}Ra, ^{228}Ra, ^{230}Th, ^{228}Th, ^{231}Pa, ^{227}Ac, ^{125}I, ^{129}I	100	300	20
Th-nat, ^{232}Th, ^{90}Sr, ^{223}Ra, ^{224}Ra, ^{232}U, ^{126}I, ^{131}I, ^{133}I	1,000	3,000	200
B-γ emitters (nuclides with decay modes other than α-emission or SF) except ^{90}Sr and others noted above	5,000 (β-γ)	15,000 (β-γ)	1,000 (β-γ)

Notes:

[a]Where surface contamination by both α- and β-γ-emitting nuclides exists, the limits established for α- and β-γ-emitting nuclides should apply independently. [The values apply to radioactive contamination deposited on, but not incorporated into the interior of, the contaminated item.]

[b]As used in this table, dpm means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c]Measurements of average contamination should not be averaged over more than 1 m^2. For objects of less surface area, the average should be derived for each such object.

[d][The average and maximum radiation levels associated with surface contamination resulting from β-γ-emitting nuclides should not exceed 0.2 mrad/h @ 1 cm and 1.0 mrad/h @ 1 cm, respectively, measured through 7 mg/cm^2 of total absorber.]

[e]The maximum contamination level applies to an area of not more than 100 cm^2.

[f]The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent material, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. [The use of dry material may not be appropriate for tritium.] When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire area should be wiped. [Except for transuranics and ^{228}Ra, ^{227}Ac, ^{228}Th, ^{230}Th, ^{231}Pa, and α-emitters, it is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination (i.e., removable and fixed) is within the limits for removable contamination.]

b. The 100-cm^2 area was established primarily because of the typical types of portable instruments available at the time the Guide was established. The factor of three between the acceptable surface concentrations averaged over a meter-squared area to the maximum for 100 cm^2 has been similarly applied to naturally occurring radioactive material contamination in land areas. The Conference of Radiation Control Program Directors in "Implementation Guidance for Regulation and Licensing of Technologically Enhanced NORM, Part N" recommended a maximum acceptable concentration for residuals in 1-m^2 areas three-fold higher than that deemed acceptable average over a 100-m^2 area. Nevertheless, more recent dose modeling techniques have demonstrated isotope-specific scaling factors between acceptable levels of residual concentration for standard areas, 1 m^2, 100 cm^2, etc. For example, in risk modeling completed for WGP on shelter surfaces at the Boeing Michigan Aeronautical Research Center missile accident site, McGuire AFB, NJ[1], areas of highly localized contamination had no difference in projected dose to hypothetical occupants compared to the same amount of radioactive material uniformly distributed on surfaces. The reason this is the case for WGP is that the vast majority of projected dose to hypothetical occupants is from ingestion and inhalation pathways. The inhalation exposure pathway assumes that the contamination is suspended in the air of a structure, thoroughly mixed, and available for inhalation exposures. As well, WGP has insignificant external radiation emissions. The same is the case for HEU deposited on surfaces, where virtually all modeled dose is attributed to internal exposure pathways. As such for contaminants of this type, the removable contamination criterion is more important than the total, and the averaging area of samples has little bearing on the relative health hazard. DU, as a surface contaminant, provides some external pathway contribution to doses to the occupants of buildings with surface contamination; however, the vast majority of projected dose is from internal exposure pathways.

[1] Rademacher SE, Hubbell JL, Favret DJ. Boeing Michigan Aeronautical Research Center (BOMARC) missile shelters and bunkers scoping survey report. Brooks City-Case, TX: U.S. Air Force School of Aerospace Medicine; 2009 Jun. Special Report AFRL-SA-BR-SR-2009-0005.

Attachment 4
Survey Results for Igloos (In-situ Measurements)

Survey Grid Format for C-Structure (Igloos)

		Structure Overall Width = 26 feet, Individual Survey Cell Width = 18 inches																
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Structure Overall Length = 82 feet, Individual Survey Cell Length = 13.7 feet	1																	
	2																	
	3																	
	4																	
	5																	
	6																	
								Door										

Instrument =	Ludlum Model 2224-1 Scaler/Ratemeter (127836) w/ Ludlum Model 239-1F Floor Monitor (143637)
Survey Date =	10-Dec-12
Personnel =	[redacted]
Shelter Number =	584
Survey Data Type =	Floor Scan w/ 30 Second Integration

Gross Alpha Counts per 30 Seconds

Igloo Length Cell Letters

Back		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q		
Igloo Width Cell Letters	1	5	5	4	3	5	5	10	6	6	1	5	7	4	12	7	10	11	μ =	5.54
	2	7	5	9	7	3	4	5	5	4	4	8	9	6	8	5	4	4	σ =	2.23
	3	6	4	6	5	6	7	8	6	4	4	4	4	4	3	2	8	8	%CV =	40.2
	4	5	4	8	1	7	4	7	3	9	4	8	4	4	6	10	7	3	Max =	12
	5	5	5	5	8	5	9	5	5	4	3	2	8	7	5	5	2	2	Min =	1
	6	6	3	5	3	5	6	6	8	6	8	5	4	3	8	4	4	10	Median =	5
Front																				

Gross Beta Counts per 30 Seconds

Igloo Length Cell Letters

Back		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q		
Igloo Width Cell Letters	1	237	208	209	234	235	196	216	183	180	213	221	247	219	237	225	228	245	μ =	212.06
	2	243	217	211	178	186	175	226	202	181	195	225	192	207	194	249	220	236	σ =	24.07
	3	229	207	202	193	183	175	180	174	207	216	226	197	193	227	246	234	264	%CV =	11.3
	4	237	227	222	225	185	195	191	222	209	191	209	204	211	236	251	256	247	Max =	286
	5	199	191	192	193	185	207	184	198	184	175	189	200	199	230	210	255	286	Min =	171
	6	258	193	243	199	188	196	171	212	190	210	207	223	203	211	214	237	257	Median =	209
Front																				

Ratio: Gross Alpha/Beta Counts

Igloo Length Cell Letters

Back		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q		
Igloo Width Cell Letters	1	0.021	0.024	0.019	0.013	0.021	0.026	0.046	0.033	0.033	0.005	0.023	0.028	0.018	0.051	0.031	0.044	0.045	μ =	0.026
	2	0.029	0.023	0.043	0.039	0.016	0.023	0.022	0.025	0.022	0.021	0.036	0.047	0.029	0.041	0.020	0.018	0.017	σ =	0.010
	3	0.026	0.019	0.030	0.026	0.033	0.040	0.044	0.034	0.019	0.019	0.018	0.020	0.021	0.013	0.008	0.034	0.030	%CV =	39.5
	4	0.021	0.018	0.036	0.004	0.038	0.021	0.037	0.014	0.043	0.021	0.038	0.020	0.019	0.025	0.040	0.027	0.012		
	5	0.025	0.026	0.026	0.041	0.027	0.043	0.027	0.025	0.022	0.017	0.011	0.040	0.035	0.022	0.024	0.008	0.007		
	6	0.023	0.016	0.021	0.015	0.027	0.031	0.035	0.038	0.032	0.038	0.024	0.018	0.015	0.038	0.019	0.017	0.039		
Front																				

Instrument =	Ludlum Model 2224-1 Scaler/Ratemeter (127836) w/ Ludlum Model 239-1F Floor Monitor (143637)
Survey Date =	11-Dec-12
Personnel =	[redacted]
Shelter Number =	586
Survey Data Type =	Floor Scan w/ 30 Second Integration

Gross Alpha Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	4	1	5	4	5	3	5	1	6	6	3	3	3	2	1	4	5
2	3	5	3	5	7	3	8	1	2	2	1	0	2	2	3	6	2
3	2	7	2	5	5	3	3	6	3	2	7	3	2	3	0	2	2
4	1	4	1	2	2	2	3	4	3	5	2	3	4	3	2	4	3
5	4	3	3	8	2	4	7	3	4	3	3	4	3	4	2	3	5
6	3	5	3	5	4	1	1	9	1	7	2	1	4	0	6	3	6
Front																	

μ =	3.40
σ =	1.88
%CV =	55.2
Max =	9
Min =	0
Median =	3

Gross Beta Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	193	180	194	222	223	207	186	199	170	218	211	189	227	211	208	197	197
2	217	216	211	188	216	215	187	190	177	196	175	201	221	243	246	229	237
3	220	258	243	203	260	214	200	220	214	193	183	197	255	251	221	242	240
4	236	202	239	229	222	238	232	239	213	212	180	232	193	203	233	241	220
5	218	221	215	229	238	248	204	203	177	215	210	214	213	242	232	239	194
6	233	225	227	214	202	174	210	221	215	219	184	215	250	195	236	229	253
Front																	

μ =	215.58
σ =	21.15
%CV =	9.8
Max =	260
Min =	170
Median =	215

Ratio: Gross Alpha/Beta Counts

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	0.021	0.006	0.026	0.018	0.022	0.014	0.027	0.005	0.035	0.028	0.014	0.016	0.013	0.009	0.005	0.020	0.025
2	0.014	0.023	0.014	0.027	0.032	0.014	0.043	0.005	0.011	0.010	0.006	0.000	0.009	0.008	0.012	0.026	0.008
3	0.009	0.027	0.008	0.025	0.019	0.014	0.015	0.027	0.014	0.010	0.038	0.015	0.008	0.012	0.000	0.008	0.008
4	0.004	0.020	0.004	0.009	0.009	0.008	0.013	0.017	0.014	0.024	0.011	0.013	0.021	0.015	0.009	0.017	0.014
5	0.018	0.014	0.014	0.035	0.008	0.016	0.034	0.015	0.023	0.014	0.014	0.019	0.014	0.017	0.009	0.013	0.026
6	0.013	0.022	0.013	0.023	0.020	0.006	0.005	0.041	0.005	0.032	0.011	0.005	0.016	0.000	0.025	0.013	0.024
Front																	

μ =	0.016
σ =	0.009
%CV =	56.9

Instrument =	Ludlum Model 2224-1 Scaler/Ratemeter (127836) w/ Ludlum Model 239-1F Floor Monitor (143637)
Survey Date =	11-Dec-12
Personnel =	[redacted]
Shelter Number =	587
Survey Data Type =	Floor Scan w/ 30 Second Integration

Gross Alpha Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	2	2	3	1	4	5	2	1	2	1	6	2	5	0	2	3	4
2	4	2	0	3	0	1	4	2	1	1	3	2	4	1	1	2	4
3	5	4	1	2	4	3	5	5	4	4	2	3	0	2	2	6	5
4	4	3	2	3	1	2	2	5	2	1	4	3	2	4	4	4	3
5	5	2	6	4	3	4	3	4	1	4	3	1	1	3	4	2	0
6	2	1	3	2	3	0	1	2	7	1	5	2	3	2	1	5	1
Front																	

μ =	2.72
σ =	1.58
%CV =	58.0
Max =	7
Min =	0
Median =	2.5

Gross Beta Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	187	168	208	185	222	184	210	175	194	194	184	178	182	204	193	193	218
2	207	198	172	214	179	184	176	162	194	164	184	194	189	199	187	194	228
3	195	184	204	174	199	161	204	174	160	190	190	192	182	171	187	204	204
4	175	201	187	201	192	181	181	164	169	172	162	184	192	206	215	215	267
5	232	241	191	187	183	161	159	180	176	207	182	216	193	200	211	241	244
6	242	230	198	213	191	193	177	198	162	208	172	187	198	206	207	231	249
Front																	

μ =	194.21
σ =	21.48
%CV =	11.1
Max =	267
Min =	159
Median =	192

Ratio: Gross Alpha/Beta Counts

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	0.011	0.012	0.014	0.005	0.018	0.027	0.010	0.006	0.010	0.005	0.033	0.011	0.027	0.000	0.010	0.016	0.018
2	0.019	0.010	0.000	0.014	0.000	0.005	0.023	0.012	0.005	0.006	0.016	0.010	0.021	0.005	0.005	0.010	0.018
3	0.026	0.022	0.005	0.011	0.020	0.019	0.025	0.029	0.025	0.021	0.011	0.016	0.000	0.012	0.011	0.029	0.025
4	0.023	0.015	0.011	0.015	0.005	0.011	0.011	0.030	0.012	0.006	0.025	0.016	0.010	0.019	0.019	0.019	0.011
5	0.022	0.008	0.031	0.021	0.016	0.025	0.019	0.022	0.006	0.019	0.016	0.005	0.005	0.015	0.019	0.008	0.000
6	0.008	0.004	0.015	0.009	0.016	0.000	0.006	0.010	0.043	0.005	0.029	0.011	0.015	0.010	0.005	0.022	0.004
Front																	

μ =	0.014
σ =	0.009
%CV =	60.4

Instrument =	Ludlum Model 2224-1 Scaler/Ratemeter (127836) w/ Ludlum Model 239-1F Floor Monitor (143637)
Survey Date =	13-Dec-12
Personnel =	[redacted]
Shelter Number =	588
Survey Data Type =	Floor Scan w/ 30 Second Integration

Gross Alpha Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	3	4	4	2	1	7	5	3	5	7	4	6	5	1	2	2	3
2	4	7	2	7	3	3	3	6	3	1	3	5	2	4	3	4	4
3	5	6	3	4	6	4	4	2	2	5	2	6	5	5	1	6	2
4	1	2	7	5	5	5	2	4	6	1	3	2	5	4	4	2	7
5	7	3	6	3	5	3	3	2	1	5	4	4	2	11	2	2	4
6	3	5	9	3	4	6	5	8	4	6	2	5	1	7	3	3	2
Front																	

μ =	3.96
σ =	1.95
%CV =	49.3
Max =	11
Min =	1
Median =	4

Gross Beta Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	212	208	224	227	190	183	174	201	208	244	219	217	222	211	216	226	239
2	223	193	248	235	244	231	210	243	251	247	235	217	241	245	276	227	240
3	227	225	229	225	216	225	228	220	254	246	229	234	219	232	207	245	211
4	236	230	228	251	209	210	234	250	228	219	225	233	211	217	233	208	216
5	254	271	230	150	224	219	224	252	247	251	248	212	225	212	224	216	189
6	224	254	260	234	215	210	238	234	215	210	238	234	225	226	198	210	224
Front																	

μ =	225.82
σ =	19.29
%CV =	8.5
Max =	276
Min =	150
Median =	225

Ratio: Gross Alpha/Beta Counts

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	0.014	0.019	0.018	0.009	0.005	0.038	0.029	0.015	0.024	0.029	0.018	0.028	0.023	0.005	0.009	0.009	0.013
2	0.018	0.036	0.008	0.030	0.012	0.013	0.014	0.025	0.012	0.004	0.013	0.023	0.008	0.016	0.011	0.018	0.017
3	0.022	0.027	0.013	0.018	0.028	0.018	0.018	0.009	0.008	0.020	0.009	0.026	0.023	0.022	0.005	0.024	0.009
4	0.004	0.009	0.031	0.020	0.024	0.024	0.009	0.016	0.026	0.005	0.013	0.009	0.024	0.018	0.017	0.010	0.032
5	0.028	0.011	0.026	0.020	0.022	0.014	0.013	0.008	0.004	0.020	0.016	0.019	0.009	0.052	0.009	0.009	0.021
6	0.013	0.020	0.035	0.013	0.019	0.029	0.021	0.034	0.019	0.029	0.008	0.021	0.004	0.031	0.015	0.014	0.009
Front																	

μ =	0.018
σ =	0.009
%CV =	50.4

Instrument =	Ludlum Model 2224-1 Scaler/Ratemeter (127836) w/ Ludlum Model 239-1F Floor Monitor (143637)
Survey Date =	13-Dec-12
Personnel =	[redacted]
Shelter Number =	589
Survey Data Type =	Floor Scan w/ 30 Second Integration

Gross Alpha Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q		
Back																			
1	4	7	3	2	2	2	3	2	1	2	3	5	3	1	9	2	1	μ =	3.32
2	5	3	6	3	2	7	5	4	1	6	5	5	4	3	0	2	3	σ =	1.87
3	4	1	4	2	3	2	4	5	4	2	3	1	1	3	5	1	2	%CV =	56.4
4	4	2	3	1	3	6	4	1	3	1	6	2	5	5	5	2	2	Max =	10
5	6	3	3	2	2	4	3	3	10	2	6	5	4	4	5	2	2	Min =	0
6	2	2	5	0	3	4	5	3	4	2	5	3	3	8	1	4	1	Median =	3
Front																			

Gross Beta Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q		
Back																			
1	202	204	192	229	191	210	208	219	207	204	204	195	197	198	214	194	187	μ =	200.52
2	215	180	175	194	176	194	198	229	194	208	196	169	187	177	206	177	208	σ =	17.63
3	201	206	208	225	174	202	172	209	204	185	196	167	215	202	199	185	211	%CV =	8.8
4	188	195	176	175	190	190	193	163	175	205	177	189	184	190	205	221	182	Max =	255
5	212	216	218	222	200	182	191	192	202	208	177	177	221	224	213	230	205	Min =	163
6	207	219	226	230	232	202	222	198	186	188	204	200	211	233	217	255	236	Median =	201.5
Front																			

Ratio: Gross Alpha/Beta Counts

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q		
Back																			
1	0.020	0.034	0.016	0.009	0.010	0.010	0.014	0.009	0.005	0.010	0.015	0.026	0.015	0.005	0.042	0.010	0.005	μ =	0.017
2	0.023	0.017	0.034	0.015	0.011	0.036	0.025	0.017	0.005	0.029	0.026	0.030	0.021	0.017	0.000	0.011	0.014	σ =	0.009
3	0.020	0.005	0.019	0.009	0.017	0.010	0.023	0.024	0.020	0.011	0.015	0.006	0.005	0.015	0.025	0.005	0.009	%CV =	56.4
4	0.021	0.010	0.017	0.006	0.016	0.032	0.021	0.006	0.017	0.005	0.034	0.011	0.027	0.026	0.024	0.009	0.011		
5	0.028	0.014	0.014	0.009	0.010	0.022	0.016	0.016	0.050	0.010	0.034	0.028	0.018	0.018	0.023	0.009	0.010		
6	0.010	0.009	0.022	0.000	0.013	0.020	0.023	0.015	0.022	0.011	0.025	0.015	0.014	0.034	0.005	0.016	0.004		
Front																			

Instrument =	Ludlum Model 2224-1 Scaler/Ratemeter (127836) w/ Ludlum Model 239-1F Floor Monitor (143637)
Survey Date =	13-Dec-12
Personnel =	[redacted]
Shelter Number =	590
Survey Data Type =	Floor Scan w/ 30 Second Integration

Gross Alpha Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back 1	5	0	3	2	2	5	2	3	4	0	1	4	3	6	6	5	2
2	9	1	5	3	6	5	4	3	5	2	3	1	3	2	3	5	1
3	4	3	9	3	5	8	4	3	0	1	2	7	5	2	4	5	2
4	3	10	10	5	3	6	4	4	4	1	4	1	4	5	8	4	2
5	1	2	4	3	3	3	6	1	6	3	2	3	4	5	2	6	6
Front 6	11	8	2	4	2	4	2	2	7	2	3	7	5	5	1	8	0

μ =	3.84
σ =	2.34
%CV =	60.8
Max =	11
Min =	0
Median =	3.5

Gross Beta Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back 1	204	182	173	220	199	180	208	209	186	164	199	188	164	175	192	171	209
2	186	197	209	179	205	185	187	157	185	189	179	214	190	181	177	178	245
3	207	226	189	215	208	192	175	205	193	190	184	205	179	186	202	219	189
4	183	198	164	175	194	186	180	190	159	183	152	169	181	184	210	191	209
5	195	200	191	206	192	185	159	166	195	209	174	173	210	183	168	198	197
Front 6	204	179	189	201	174	233	191	202	207	201	169	172	202	228	171	199	164

μ =	190.44
σ =	17.39
%CV =	9.1
Max =	245
Min =	152
Median =	189.5

Ratio: Gross Alpha/Beta Counts

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back 1	0.025	0.000	0.017	0.009	0.010	0.028	0.010	0.014	0.022	0.000	0.005	0.021	0.018	0.034	0.031	0.029	0.010
2	0.048	0.005	0.024	0.017	0.029	0.027	0.021	0.019	0.027	0.011	0.017	0.005	0.016	0.011	0.017	0.028	0.004
3	0.019	0.013	0.048	0.014	0.024	0.042	0.023	0.015	0.000	0.005	0.011	0.034	0.028	0.011	0.020	0.023	0.011
4	0.016	0.051	0.061	0.029	0.015	0.032	0.022	0.021	0.025	0.005	0.026	0.006	0.022	0.027	0.038	0.021	0.010
5	0.005	0.010	0.021	0.015	0.016	0.016	0.038	0.006	0.031	0.014	0.011	0.017	0.019	0.027	0.012	0.030	0.030
Front 6	0.054	0.045	0.011	0.020	0.011	0.017	0.010	0.010	0.034	0.010	0.018	0.041	0.025	0.022	0.006	0.040	0.000

μ =	0.020
σ =	0.012
%CV =	61.4

Instrument =	Ludlum Model 2224-1 Scaler/Ratemeter (127836) w/ Ludlum Model 239-1F Floor Monitor (143637)
Survey Date =	11-Dec-12
Personnel =	[redacted]
Shelter Number =	595
Survey Data Type =	Floor Scan w/ 30 Second Integration

Gross Alpha Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	5	3	5	5	1	0	1	5	4	1	2	1	3	3	3	3	2
2	1	7	1	4	5	3	5	3	3	7	4	0	3	4	3	2	1
3	4	5	2	4	4	3	6	5	3	3	2	1	6	1	2	0	3
4	3	2	6	5	4	5	3	5	6	9	7	4	6	0	0	3	1
5	4	5	6	4	4	3	3	3	1	3	3	6	3	3	4	3	2
6	3	1	5	3	3	8	4	5	1	5	3	4	2	1	4	1	2
Front																	

μ =	3.34
σ =	1.86
%CV =	55.8
Max =	9
Min =	0
Median =	3

Gross Beta Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	277	229	231	234	249	240	247	202	216	202	206	224	203	208	265	254	266
2	231	221	201	205	203	227	199	207	202	196	202	215	211	223	218	219	259
3	204	207	229	192	223	192	191	183	206	195	193	189	228	199	227	239	223
4	202	211	191	202	190	176	159	204	192	189	179	192	200	216	230	255	268
5	236	235	247	206	215	210	167	198	199	170	184	213	200	228	244	260	248
6	233	224	228	213	209	195	225	215	179	193	182	214	224	273	267	285	264
Front																	

μ =	216.19
σ =	26.01
%CV =	12.0
Max =	285
Min =	159
Median =	212

Ratio: Gross Alpha/Beta Counts

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	0.018	0.013	0.022	0.021	0.004	0.000	0.004	0.025	0.019	0.005	0.010	0.004	0.015	0.014	0.011	0.012	0.008
2	0.004	0.032	0.005	0.020	0.025	0.013	0.025	0.014	0.015	0.036	0.020	0.000	0.014	0.018	0.014	0.009	0.004
3	0.020	0.024	0.009	0.021	0.018	0.016	0.031	0.027	0.015	0.015	0.010	0.005	0.026	0.005	0.009	0.000	0.013
4	0.015	0.009	0.031	0.025	0.021	0.028	0.019	0.025	0.031	0.048	0.039	0.021	0.030	0.000	0.000	0.012	0.004
5	0.017	0.021	0.024	0.019	0.019	0.014	0.018	0.015	0.005	0.018	0.016	0.028	0.015	0.013	0.016	0.012	0.008
6	0.013	0.004	0.022	0.014	0.014	0.041	0.018	0.023	0.006	0.026	0.016	0.019	0.009	0.004	0.015	0.004	0.008
Front																	

μ =	0.016
σ =	0.010
%CV =	59.6

Instrument =	Ludlum Model 2224-1 Scaler/Ratemeter (127836) w/ Ludlum Model 239-1F Floor Monitor (143637)
Survey Date =	11 Dec 12 & 12 Dec 12
Personnel =	[redacted]
Shelter Number =	596
Survey Data Type =	Floor Scan w/ 30 Second Integration

Gross Alpha Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	2	7	3	6	1	2	3	1	4	6	8	9	7	3	5	4	4
2	5	2	3	2	5	8	3	2	7	2	6	10	3	1	1	4	6
3	4	6	5	3	3	1	2	2	21	6	5	4	5	7	4	7	4
4	4	4	2	5	2	5	3	1	13	8	4	10	4	4	4	4	5
5	0	3	5	1	4	1	7	2	5	6	5	5	2	6	3	3	6
6	4	1	3	1	5	2	3	3	9	6	5	5	3	4	6	7	3
Front																	

μ =	4.41
σ =	2.85
%CV =	64.6
Max =	21
Min =	0
Median =	4

Gross Beta Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	205	188	169	206	191	201	216	191	177	180	189	169	183	199	218	202	163
2	180	168	188	200	188	201	212	193	178	180	176	171	204	181	203	174	200
3	182	179	166	179	168	160	178	169	164	167	178	175	172	177	157	168	182
4	192	166	184	188	175	206	196	175	139	178	166	159	152	155	175	184	199
5	177	181	179	158	159	190	207	195	180	186	167	154	168	162	150	180	196
6	216	187	186	166	185	189	204	191	206	172	168	196	168	176	210	208	204
Front																	

μ =	182.11
σ =	16.59
%CV =	9.1
Max =	218
Min =	139
Median =	180

Gross Alpha/Beta Counts

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	0.010	0.037	0.018	0.029	0.005	0.010	0.014	0.005	0.023	0.033	0.042	0.053	0.038	0.015	0.023	0.020	0.025
2	0.028	0.012	0.016	0.010	0.027	0.040	0.014	0.010	0.039	0.011	0.034	0.058	0.015	0.006	0.005	0.023	0.030
3	0.022	0.034	0.030	0.017	0.018	0.006	0.011	0.012	0.128	0.036	0.028	0.023	0.029	0.040	0.025	0.042	0.022
4	0.021	0.024	0.011	0.027	0.011	0.024	0.015	0.006	0.094	0.045	0.024	0.063	0.026	0.026	0.023	0.022	0.025
5	0.000	0.017	0.028	0.006	0.025	0.005	0.034	0.010	0.028	0.032	0.030	0.032	0.012	0.037	0.020	0.017	0.031
6	0.019	0.005	0.016	0.006	0.027	0.011	0.015	0.016	0.044	0.035	0.030	0.026	0.018	0.023	0.029	0.034	0.015
Front																	

μ =	0.025
σ =	0.017
%CV =	70.5

Instrument =	Ludlum Model 2224-1 Scaler/Ratemeter (127836) w/ Ludlum Model 239-1F Floor Monitor (143637)
Survey Date =	12-Dec-12
Personnel =	[redacted]
Shelter Number =	597
Survey Data Type =	Floor Scan w/ 30 Second Integration

Gross Alpha Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	4	5	6	4	5	10	1	6	4	4	2	3	4	5	8	1	2
2	5	6	3	4	3	6	4	7	4	3	7	3	4	12	1	3	2
3	9	5	3	6	3	4	10	6	0	2	3	2	2	2	4	3	3
4	4	6	2	4	1	1	4	5	5	1	4	2	1	6	2	6	5
5	5	3	5	5	5	6	7	2	1	2	3	3	2	5	2	2	1
6	8	5	4	3	6	2	8	4	5	6	5	9	2	1	5	7	2
Front																	

μ =	4.10
σ =	2.28
%CV =	55.7
Max =	12
Min =	0
Median =	4

Gross Beta Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	182	203	241	185	227	172	168	205	183	207	105	204	197	230	221	223	259
2	191	217	202	210	190	167	194	165	161	187	181	182	212	223	227	237	229
3	209	181	174	188	202	192	190	182	195	191	207	194	177	216	232	216	235
4	220	187	173	201	168	193	175	163	185	169	163	198	208	208	232	213	223
5	204	180	185	190	201	174	174	193	196	209	185	173	192	182	204	205	212
6	220	204	178	185	188	206	174	177	194	212	212	194	181	189	215	217	210
Front																	

μ =	196.69
σ =	22.04
%CV =	11.2
Max =	259
Min =	105
Median =	194

Ratio: Gross Alpha/Beta Counts

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	0.022	0.025	0.025	0.022	0.022	0.058	0.006	0.029	0.022	0.019	0.019	0.015	0.020	0.022	0.036	0.004	0.008
2	0.026	0.028	0.015	0.019	0.016	0.036	0.021	0.042	0.025	0.016	0.039	0.016	0.019	0.054	0.004	0.013	0.009
3	0.043	0.028	0.017	0.032	0.015	0.021	0.053	0.033	0.000	0.010	0.014	0.010	0.011	0.009	0.017	0.014	0.013
4	0.018	0.032	0.012	0.020	0.006	0.005	0.023	0.031	0.027	0.006	0.025	0.010	0.005	0.029	0.009	0.028	0.022
5	0.025	0.017	0.027	0.026	0.025	0.034	0.040	0.010	0.005	0.010	0.016	0.017	0.010	0.027	0.010	0.010	0.005
6	0.036	0.025	0.022	0.016	0.032	0.010	0.046	0.023	0.026	0.028	0.024	0.046	0.011	0.005	0.023	0.032	0.010
Front																	

μ =	0.021
σ =	0.012
%CV =	56.3

Instrument =	Ludlum Model 2224-1 Scaler/Ratemeter (127836) w/ Ludlum Model 239-1F Floor Monitor (143637)
Survey Date =	12-Dec-12
Personnel =	[redacted]
Shelter Number =	598
Survey Data Type =	Floor Scan w/ 30 Second Integration

Gross Alpha Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	4	7	5	15	3	4	2	3	3	4	5	2	2	0	2	6	4
2	2	3	6	11	4	5	1	3	4	4	3	3	1	3	3	3	4
3	1	4	3	13	1	3	2	6	6	6	3	5	6	1	6	1	7
4	5	2	0	1	5	1	3	3	4	3	4	9	2	4	2	2	1
5	0	1	6	4	6	6	1	8	1	3	5	1	3	2	3	4	3
6	4	5	0	3	1	4	3	5	0	3	2	3	5	4	0	1	2
Front																	

μ =	3.54
σ =	2.53
%CV =	71.4
Max =	15
Min =	0
Median =	3

Gross Beta Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	218	201	193	236	191	174	183	187	146	173	184	161	176	193	179	193	235
2	222	192	196	211	195	178	185	195	168	181	193	157	195	170	161	175	199
3	232	214	162	182	183	193	172	168	180	195	190	195	174	193	181	191	225
4	225	210	208	185	165	192	176	195	195	192	197	194	189	216	232	191	215
5	233	233	213	194	207	222	195	205	234	215	192	186	174	195	196	279	228
6	229	226	205	206	204	229	221	199	193	208	196	194	200	200	193	201	229
Front																	

μ =	197.42
σ =	21.40
%CV =	10.8
Max =	279
Min =	146
Median =	195

Ratio: Gross Alpha/Beta Counts

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	0.018	0.035	0.026	0.064	0.016	0.023	0.011	0.016	0.021	0.023	0.027	0.012	0.011	0.000	0.011	0.031	0.017
2	0.009	0.016	0.031	0.052	0.021	0.028	0.005	0.015	0.024	0.022	0.016	0.019	0.005	0.018	0.019	0.017	0.020
3	0.004	0.019	0.019	0.071	0.005	0.016	0.012	0.036	0.033	0.031	0.016	0.026	0.034	0.005	0.033	0.005	0.031
4	0.022	0.010	0.000	0.005	0.030	0.005	0.017	0.015	0.021	0.016	0.020	0.046	0.011	0.019	0.009	0.010	0.005
5	0.000	0.004	0.028	0.021	0.029	0.027	0.005	0.039	0.004	0.014	0.026	0.005	0.017	0.010	0.015	0.014	0.013
6	0.017	0.022	0.000	0.015	0.005	0.017	0.014	0.025	0.000	0.014	0.010	0.015	0.025	0.020	0.000	0.005	0.009
Front																	

μ =	0.018
σ =	0.013
%CV =	69.4

Instrument =	Ludlum Model 2224-1 Scaler/Ratemeter (127836) w/ Ludlum Model 239-1F Floor Monitor (143637)
Survey Date =	12-Dec-12
Personnel =	[redacted]
Shelter Number =	599
Survey Data Type =	Floor Scan w/ 30 Second Integration

Gross Alpha Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	3	3	5	5	4	2	6	5	4	3	5	2	4	0	2	3	6
2	4	1	4	2	5	4	1	2	2	7	4	2	2	4	1	3	4
3	4	5	2	3	2	4	3	2	6	3	2	3	2	2	2	3	6
4	7	4	3	3	5	1	3	4	7	5	5	4	5	0	3	4	3
5	3	5	4	5	5	4	5	2	5	4	3	4	4	4	6	3	1
6	4	2	5	2	5	4	6	4	4	3	4	3	3	0	3	3	3

Back / Front

μ =	3.52
σ =	1.52
%CV =	43.2
Max =	7
Min =	0
Median =	4

Gross Beta Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	209	228	185	181	222	209	201	226	200	197	206	220	215	222	181	215	198
2	214	196	212	208	200	218	214	228	211	236	224	193	197	209	203	170	253
3	205	190	210	214	243	246	220	232	237	219	217	202	240	205	218	230	215
4	209	188	204	194	191	233	226	236	221	235	230	196	211	230	221	215	229
5	219	227	195	199	255	226	196	223	235	239	213	213	230	247	200	220	193
6	196	179	201	223	210	199	208	216	225	205	242	230	202	222	234	218	229

Back / Front

μ =	214.53
σ =	17.08
%CV =	8.0
Max =	255
Min =	170
Median =	215

Ratio: Gross Alpha/Beta Counts

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	0.014	0.013	0.027	0.028	0.018	0.010	0.030	0.022	0.020	0.015	0.024	0.009	0.019	0.000	0.011	0.014	0.030
2	0.019	0.005	0.019	0.010	0.025	0.018	0.005	0.009	0.009	0.030	0.018	0.010	0.010	0.019	0.005	0.018	0.016
3	0.020	0.026	0.010	0.014	0.008	0.016	0.014	0.009	0.025	0.014	0.009	0.015	0.008	0.010	0.009	0.013	0.028
4	0.033	0.021	0.015	0.015	0.026	0.004	0.013	0.017	0.032	0.021	0.022	0.020	0.024	0.000	0.014	0.019	0.013
5	0.014	0.022	0.021	0.025	0.020	0.018	0.026	0.009	0.021	0.017	0.014	0.019	0.017	0.016	0.030	0.014	0.005
6	0.020	0.011	0.025	0.009	0.024	0.020	0.029	0.019	0.018	0.015	0.017	0.013	0.015	0.000	0.013	0.014	0.013

Back / Front

μ =	0.017
σ =	0.007
%CV =	44.1

Instrument =	Ludlum Model 2224-1 Scaler/Ratemeter (127836) w/ Ludlum Model 239-1F Floor Monitor (143637)
Survey Date =	13-Dec-12
Personnel =	[redacted]
Shelter Number =	1100
Survey Data Type =	Floor Scan w/ 30 Second Integration

Gross Alpha Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	1	1	1	2	1	5	3	1	0	3	1	1	3	5	1	3	4
2	2	5	9	3	0	2	0	2	2	4	4	1	2	1	2	3	1
3	2	3	6	1	5	3	6	4	3	5	1	2	3	4	4	3	3
4	4	4	5	4	2	2	3	5	2	3	4	4	2	4	1	6	2
5	2	1	5	4	2	7	4	2	5	6	10	1	5	2	3	3	2
6	6	3	2	3	1	4	5	3	3	2	2	4	4	3	3	1	3

Front

μ =	3.04
σ =	1.80
%CV =	59.3
Max =	10
Min =	0
Median =	3

Gross Beta Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	251	252	201	239	239	237	230	219	208	240	236	209	241	230	220	236	224
2	218	209	224	228	206	230	223	224	210	194	194	192	231	200	220	249	243
3	240	234	229	200	227	185	242	190	217	210	211	212	220	224	199	226	223
4	233	211	230	199	204	235	225	206	224	219	212	208	219	238	245	214	229
5	239	212	224	240	235	241	237	239	215	203	226	231	225	223	251	225	248
6	204	247	246	219	222	215	253	241	222	233	206	224	211	226	287	202	233

Front

μ =	224.04
σ =	16.83
%CV =	7.5
Max =	287
Min =	185
Median =	224

Ratio: Gross Alpha/Beta Counts

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	0.004	0.004	0.005	0.008	0.004	0.021	0.013	0.005	0.000	0.013	0.004	0.005	0.012	0.022	0.005	0.013	0.018
2	0.009	0.024	0.040	0.013	0.000	0.009	0.000	0.009	0.010	0.021	0.021	0.005	0.009	0.005	0.009	0.012	0.004
3	0.008	0.013	0.026	0.005	0.022	0.016	0.025	0.021	0.014	0.024	0.005	0.009	0.014	0.018	0.020	0.013	0.013
4	0.017	0.019	0.022	0.020	0.010	0.009	0.013	0.024	0.009	0.014	0.019	0.019	0.009	0.017	0.004	0.028	0.009
5	0.008	0.005	0.022	0.017	0.009	0.029	0.017	0.008	0.023	0.030	0.044	0.004	0.022	0.009	0.012	0.013	0.008
6	0.029	0.012	0.008	0.014	0.005	0.019	0.020	0.012	0.014	0.009	0.010	0.018	0.019	0.013	0.010	0.005	0.013

Front

μ =	0.014
σ =	0.008
%CV =	60.1

Instrument =	Ludlum Model 2224-1 Scaler/Ratemeter (127836) w/ Ludlum Model 239-1F Floor Monitor (143637)
Survey Date =	13-Dec-12
Personnel =	[redacted]
Shelter Number =	1101
Survey Data Type =	Floor Scan w/ 30 Second Integration

Gross Alpha Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	2	1	8	2	3	6	4	3	8	6	2	7	3	5	3	4	3
2	2	4	4	3	5	1	4	2	5	5	2	5	2	2	0	2	6
3	2	5	1	5	4	3	5	7	3	2	2	1	5	3	1	1	5
4	4	7	4	2	4	3	4	2	4	6	4	2	1	5	6	4	1
5	4	1	5	3	3	5	1	4	5	6	4	8	2	6	4	3	3
6	1	3	3	1	1	8	8	4	4	6	2	4	5	5	4	1	4
Front																	

μ =	3.66
σ =	1.91
%CV =	52.3
Max =	8
Min =	0
Median =	4

Gross Beta Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	202	198	185	214	203	195	215	192	183	175	193	182	200	194	231	186	225
2	234	201	185	193	184	168	173	166	195	168	179	178	188	174	196	204	230
3	208	204	209	189	190	176	159	179	168	178	186	178	167	173	203	183	216
4	215	206	244	197	181	198	171	174	188	145	189	159	165	194	194	189	186
5	239	227	199	191	179	183	154	203	162	196	190	165	192	195	208	217	206
6	226	241	194	191	174	183	184	188	175	200	169	168	195	179	169	219	248
Front																	

μ =	191.75
σ =	20.53
%CV =	10.7
Max =	248
Min =	145
Median =	190

Ratio: Gross Alpha/Beta Counts

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back																	
1	0.010	0.005	0.043	0.009	0.015	0.031	0.019	0.016	0.044	0.034	0.010	0.038	0.015	0.026	0.013	0.022	0.013
2	0.009	0.020	0.022	0.016	0.027	0.006	0.023	0.012	0.026	0.030	0.011	0.028	0.011	0.011	0.000	0.010	0.026
3	0.010	0.025	0.005	0.026	0.021	0.017	0.031	0.039	0.018	0.011	0.011	0.006	0.030	0.017	0.005	0.005	0.023
4	0.019	0.034	0.016	0.010	0.022	0.015	0.023	0.011	0.021	0.041	0.021	0.013	0.006	0.026	0.031	0.021	0.005
5	0.017	0.004	0.025	0.016	0.017	0.027	0.006	0.020	0.031	0.031	0.021	0.048	0.010	0.031	0.019	0.014	0.015
6	0.004	0.012	0.015	0.005	0.006	0.044	0.043	0.021	0.023	0.030	0.012	0.024	0.026	0.028	0.024	0.005	0.016
Front																	

μ =	0.019
σ =	0.011
%CV =	55.1

Instrument =	Ludlum Model 2224-1 Scaler/Ratemeter (127836) w/ Ludlum Model 239-1F Floor Monitor (143637)
Survey Date =	13-Dec-12
Personnel =	[redacted]
Shelter Number =	1102
Survey Data Type =	Floor Scan w/ 30 Second Integration

Gross Alpha Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back 1	10	3	4	3	3	5	5	3	5	2	5	1	4	5	0	1	2
2	6	3	3	2	2	2	5	6	3	4	2	5	4	6	4	0	3
3	4	2	4	2	2	4	8	5	3	2	6	5	6	2	3	1	2
4	2	5	1	3	1	3	3	6	2	1	4	5	4	5	4	2	3
5	3	6	1	5	6	2	3	1	5	4	5	3	6	4	3	1	3
6 Front	4	1	4	4	4	1	8	7	6	4	6	1	2	6	6	5	4

μ =	3.63
σ =	1.88
%CV =	51.9
Max =	10
Min =	0
Median =	4

Gross Beta Counts per 30 Seconds

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back 1	179	180	191	171	176	182	178	166	183	199	162	183	191	189	166	220	215
2	176	183	203	179	160	170	153	141	174	187	170	176	179	163	196	205	223
3	227	230	154	158	168	188	188	146	155	145	171	201	161	150	182	178	251
4	180	195	144	174	169	202	156	140	163	157	185	178	161	193	203	209	204
5	200	214	211	157	181	172	160	187	159	182	167	171	173	181	170	208	226
6 Front	227	226	166	171	151	150	178	168	166	159	148	117	192	182	202	214	208

μ =	180.19
σ =	23.65
%CV =	13.1
Max =	251
Min =	117
Median =	178

Ratio: Gross Alpha/Beta Counts

Igloo Length Cell Letters

Igloo Width Cell Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Back 1	0.056	0.017	0.021	0.018	0.017	0.027	0.028	0.018	0.027	0.010	0.031	0.005	0.021	0.026	0.000	0.005	0.009
2	0.034	0.016	0.015	0.011	0.013	0.012	0.033	0.043	0.017	0.021	0.012	0.028	0.022	0.037	0.020	0.000	0.013
3	0.018	0.009	0.026	0.013	0.012	0.021	0.043	0.034	0.019	0.014	0.035	0.025	0.037	0.013	0.016	0.006	0.008
4	0.011	0.026	0.007	0.017	0.006	0.015	0.019	0.043	0.012	0.006	0.022	0.028	0.025	0.026	0.020	0.010	0.015
5	0.015	0.028	0.005	0.032	0.033	0.012	0.019	0.005	0.031	0.022	0.030	0.018	0.035	0.022	0.018	0.005	0.013
6 Front	0.018	0.004	0.024	0.023	0.026	0.007	0.045	0.042	0.036	0.025	0.041	0.009	0.010	0.033	0.030	0.023	0.019

μ =	0.021
σ =	0.011
%CV =	54.5

Survey Results for Igloos (Wipes) - Building 584

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		Gross α-Radiation			Gross β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
A1	WW-12-0001	12154-01A	0.0	0.3	0.5	0.5	0.8	1.3
A2	WW-12-0002	-02A	0.4	0.5	0.5	0.9	0.9	1.3
A3	WW-12-0003	-03A	0.4	0.5	0.5	0.0	0.6	1.3
A4	WW-12-0004	-04A	0.4	0.5	0.5	0.8	0.8	0.5
A5	WW-12-0005	-05A	0.3	0.4	0.5	0.4	0.7	1.3
A6	WW-12-0006	-06A	0.0	0.3	0.5	-0.2	0.6	1.3
B1	WW-12-0007	-07A	0.1	0.3	0.5	0.2	0.7	1.3
B2	WW-12-0008	-08A	0.1	0.3	0.5	0.2	0.7	1.3
B3	WW-12-0009	-09A	0.0	0.3	0.5	0.6	0.8	1.3
B4	WW-12-0010	-10A	0.6	0.6	0.5	0.7	0.8	1.3
B5	WW-12-0011	-11A	0.6	0.6	0.5	- 0.1	0.6	1.3
B6	WW-12-0012	-12A	0.3	0.4	0.5	- 0.3	0.5	1.3
C1	WW-12-0013	-13A	0.3	0.4	0.5	1.0	0.9	1.3
C2	WW-12-0014	-14A	0.3	0.4	0.5	0.1	0.7	1.3
C3	WW-12-0015	-15A	0.0	0.3	0.5	0.9	0.9	1.3
C4	WW-12-0016	-16A	0.5	0.6	0.5	2.0	1.0	1.0
C5	WW-12-0017	-17A	0.4	0.5	0.5	1.0	0.9	1.3
C6	WW-12-0018	-18A	0.0	0.3	0.5	0.3	0.7	1.3
D1	WW-12-0019	-19A	0.4	0.5	0.5	1.0	1.0	1.0
D2	WW-12-0020	-20A	0.4	0.5	0.5	0.7	0.8	1.3
D3	WW-12-0021	-21A	0.3	0.4	0.5	1.0	0.9	1.3
D4	WW-12-0022	-22A	0.0	0.3	0.5	0.7	0.8	1.3
D5	WW-12-0023	-23A	0.4	0.5	0.5	- 0.1	0.6	1.3
D6	WW-12-0024	-24A	0.0	0.3	0.5	0.5	0.8	1.3
E1	WW-12-0025	-25A	0.9	0.7	0.5	1.0	0.9	1.3
E2	WW-12-0026	-26A	0.4	0.5	0.5	0.6	0.8	1.3
E3	WW-12-0027	-27A	6.0	2.0	1.0	4.0	1.0	1.0
E4	WW-12-0028	-28A	0.3	0.4	0.5	0.6	0.8	1.3
E5	WW-12-0029	-29A	0.1	0.3	0.5	1.2	0.9	1.3
E6	WW-12-0030	-30A	0.1	0.3	0.5	0.4	0.7	1.3
F1	WW-12-0031	-31A	0.3	0.4	0.5	2.0	1.0	1.0
F2	WW-12-0032	-32A	0.4	0.5	0.5	1.2	0.9	1.3
F3	WW-12-0033	-33A	0.6	0.6	0.5	2.0	1.0	1.0
F4	WW-12-0034	-34A	0.3	0.4	0.5	0.7	0.8	1.3
F5	WW-12-0035	-35A	0.3	0.4	0.5	0.8	0.8	1.3
F6	WW-12-0036	-36A	0.1	0.3	0.5	- 0.1	0.5	1.3
G1	WW-12-0037	-37A	0.3	0.4	0.5	0.8	0.8	1.3
G2	WW-12-0038	-38A	0.3	0.4	0.5	1.2	0.9	1.3
G3	WW-12-0039	-39A	0.3	0.4	0.5	0.5	0.8	1.3
G4	WW-12-0040	-40A	1.0	0.7	0.5	0.7	0.8	1.3
G5	WW-12-0041	-41A	0.4	0.5	0.5	0.2	0.7	1.3

Building 584, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		Gross α-Radiation			Gross β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
G6	WW-12-0042	12154-42A	0.4	0.5	0.5	0.4	0.7	1.3
H1	WW-12-0043	-43A	0.5	0.6	0.5	0.1	0.7	1.3
H2	WW-12-0044	-44A	0.4	0.5	0.5	1.0	1.0	1.0
H3	WW-12-0045	-45A	0.3	0.4	0.5	0.1	0.7	1.3
H4	WW-12-0046	-46A	0.3	0.4	0.5	0.5	0.8	1.3
H5	WW-12-0047	-47A	0.0	0.3	0.5	1.0	0.9	1.3
H6	WW-12-0048	-48A	0.4	0.5	0.5	0.2	0.7	1.3
I1	WW-12-0049	-49A	0.3	0.4	0.5	1.2	0.9	1.3
I2	WW-12-0050	-50A	0.7	0.6	0.5	0.6	0.8	1.3
I3	WW-12-0051	12156-01A	0.4	0.5	0.5	0.7	0.8	1.3
I4	WW-12-0052	-02A	0.3	0.4	0.5	0.2	0.7	1.3
I5	WW-12-0053	-03A	0.0	0.3	0.5	1.0	0.9	1.3
I6	WW-12-0054	-04A	0.4	0.5	0.4	0.4	0.7	1.3
J1	WW-12-0055	-05A	0.4	0.5	0.5	0.9	0.9	1.3
J2	WW-12-0056	-06A	0.3	0.4	0.5	0.7	0.8	1.3
J3	WW-12-0057	-07A	0.3	0.4	0.5	1.1	0.9	1.3
J4	WW-12-0058	-08A	1.1	0.8	0.5	0.4	0.7	1.3
J5	WW-12-0059	-09A	0.4	0.5	0.5	0.6	0.8	1.3
J6	WW-12-0060	-10A	0.0	0.3	0.5	- 0.2	0.6	1.3
K1	WW-12-0061	-11A	0.3	0.4	0.5	0.5	0.8	1.3
K2	WW-12-0062	-12A	0.1	0.3	0.5	0.9	0.9	1.3
K3	WW-12-0063	-13A	0.1	0.3	0.5	1.1	0.9	1.3
K4	WW-12-0064	-14A	0.4	0.5	0.5	0.9	0.9	1.3
K5	WW-12-0065	-15A	0.3	0.4	0.5	0.7	0.8	1.3
K6	WW-12-0066	-16A	0.1	0.3	0.5	0.3	0.7	1.3
L1	WW-12-0067	-17A	0.3	0.4	0.5	0.9	0.9	1.3
L2	WW-12-0068	-18A	0.0	0.3	0.5	0.1	0.7	1.3
L3	WW-12-0069	-19A	0.3	0.4	0.5	0.7	0.8	1.3
L4	WW-12-0070	-20A	0.7	0.6	0.5	1.0	0.9	1.3
L5	WW-12-0071	-21A	0.4	0.5	0.5	0.4	0.7	1.3
L6	WW-12-0072	-22A	0.1	0.3	0.5	0.2	0.7	1.3
M1	WW-12-0073	-23A	0.6	0.6	0.5	1.0	1.0	1.0
M2	WW-12-0074	-24A	0.6	0.6	0.5	2.0	1.0	1.0
M3	WW-12-0075	-25A	0.3	0.4	0.5	0.6	0.8	1.3
M4	WW-12-0076	-26A	0.5	0.6	0.5	1.0	1.0	1.0
M5	WW-12-0077	-27A	0.4	0.5	0.5	1.1	0.9	1.3
M6	WW-12-0078	-28A	0.4	0.5	0.5	0.5	0.8	1.3
N1	WW-12-0079	-29A	0.3	0.4	0.5	0.7	0.8	1.3
N2	WW-12-0080	-30A	0.3	0.4	0.5	1.0	1.0	1.0
N3	WW-12-0081	-31A	0.4	0.5	0.5	1.1	0.9	1.3
N4	WW-12-0082	-32A	0.1	0.3	0.5	1.0	0.9	1.3

Building 584, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		Gross α-Radiation			Gross β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
N5	WW-12-0083	12156-33A	0.3	0.4	0.5	0.8	0.8	1.3
N6	WW-12-0084	-34A	1.0	0.7	0.5	2.0	1.0	1.0
O1	WW-12-0085	-35A	0.6	0.6	0.5	0.7	0.8	1.3
O2	WW-12-0086	-36A	0.3	0.4	0.5	1.2	0.9	1.3
O3	WW-12-0087	-37A	0.3	0.4	0.5	0.8	0.8	1.3
O4	WW-12-0088	-38A	0.0	0.3	0.5	0.8	0.8	1.3
O5	WW-12-0089	-39A	0.3	0.4	0.5	0.8	0.8	1.3
O6	WW-12-0090	-40A	0.1	0.3	0.5	0.2	0.7	1.3
P1	WW-12-0091	-41A	0.3	0.4	0.5	1.0	0.9	1.3
P2	WW-12-0092	-42A	0.3	0.4	0.5	0.8	0.8	1.3
P3	WW-12-0093	-43A	0.1	0.3	0.5	0.5	0.8	1.3
P4	WW-12-0094	-44A	0.1	0.3	0.5	0.0	0.6	1.3
P5	WW-12-0095	-45A	0.4	0.5	0.5	0.0	0.6	1.3
P6	WW-12-0096	-46A	0.1	0.3	0.5	0.6	0.8	1.3
Q1	WW-12-0097	-47A	0.3	0.4	0.5	0.3	0.7	1.3
Q2	WW-12-0098	-48A	0.4	0.5	0.5	1.0	1.0	1.0
Q3	WW-12-0099	-49A	0.4	0.5	0.5	0.2	0.7	1.3
Q4	WW-12-0100	-50A	0.3	0.4	0.5	0.6	0.8	1.3
Q5	WW-12-0101	-51A	0.1	0.3	0.5	0.8	0.8	1.3
Q6	WW-12-0102	-52A	0.3	0.4	0.5	1.0	1.0	1.0

Building 586

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		Gross α-Radiation			Gross β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
A1	WW-12-0168	12162-02A	0.0	0.3	0.5	0.9	0.9	1.3
A2	WW-12-0169	-03A	0.4	0.5	0.5	0.9	0.9	1.3
A3	WW-12-0170	-04A	0.3	0.4	0.5	0.3	0.7	1.3
A4	WW-12-0171	-05A	0.3	0.4	0.5	0.5	0.8	1.3
A5	WW-12-0172	-06A	0.4	0.5	0.5	0.3	0.7	1.3
A6	WW-12-0173	-07A	0.1	0.3	0.5	2.0	1.0	1.0
B1	WW-12-0174	-08A	0.3	0.4	0.5	- 0.3	0.5	1.3
B2	WW-12-0175	-09A	0.3	0.4	0.5	0.4	0.7	1.3
B3	WW-12-0176	-10A	0.3	0.4	0.5	1.0	1.0	1.0
B4	WW-12-0177	-11A	0.3	0.4	0.5	0.3	0.7	1.3
B5	WW-12-0178	-12A	0.6	0.6	0.5	0.3	0.7	1.3
B6	WW-12-0179	-13A	0.3	0.4	0.5	- 0.1	0.6	1.3
C1	WW-12-0180	-14A	0.0	0.3	0.5	- 0.1	0.6	1.3
C2	WW-12-0181	-15A	0.4	0.5	0.5	2.0	1.0	1.0
C3	WW-12-0182	-16A	0.0	0.3	0.5	0.2	0.7	1.3
C4	WW-12-0183	-17A	0.0	0.3	0.5	0.2	0.7	1.3
C5	WW-12-0184	-18A	0.4	0.5	0.5	0.5	0.8	1.3
C6	WW-12-0185	-19A	0.6	0.6	0.5	0.7	0.8	1.3
D1	WW-12-0186	-20A	0.4	0.5	0.5	1.0	0.9	1.3
D2	WW-12-0187	-21A	0.1	0.3	0.5	0.5	0.8	1.3
D3	WW-12-0188	-22A	0.0	0.3	0.5	0.8	0.8	1.3
D4	WW-12-0189	-23A	0.3	0.4	0.5	0.9	0.9	1.3
D5	WW-12-0190	-24A	0.3	0.4	0.5	0.6	0.8	1.3
D6	WW-12-0191	-25A	0.1	0.3	0.5	0.0	0.6	1.3
E1	WW-12-0192	-26A	0.5	0.6	0.5	0.7	0.8	1.3
E2	WW-12-0193	-27A	0.1	0.3	0.5	2.0	1.0	1.0
E3	WW-12-0194	-28A	0.1	0.3	0.5	1.1	0.9	1.3
E4	WW-12-0195	-29A	0.3	0.4	0.5	0.7	0.8	1.3
E5	WW-12-0196	-30A	0.1	0.3	0.5	0.5	0.8	1.3
E6	WW-12-0197	-31A	0.1	0.3	0.5	1.0	1.0	1.0
F1	WW-12-0198	-32A	0.4	0.5	0.5	0.7	0.8	1.3
F2	WW-12-0199	-33A	0.3	0.4	0.5	1.0	0.9	1.3
F3	WW-12-0200	-34A	0.1	0.3	0.5	0.7	0.8	1.3
F4	WW-12-0201	-35A	0.0	0.3	0.5	0.8	0.8	1.3
F5	WW-12-0202	-36A	0.0	0.3	0.5	0.1	0.7	1.3
F6	WW-12-0203	-37A	0.5	0.6	0.5	0.7	0.8	1.3
G1	WW-12-0204	-38A	0.5	0.6	0.5	1.0	1.0	1.0
G2	WW-12-0205	-39A	0.3	0.4	0.5	1.2	0.9	1.3
G3	WW-12-0206	-40A	0.1	0.7	1.3	0.1	0.3	0.5
G4	WW-12-0207	-41A	0.5	0.6	0.5	2.0	1.0	1.0
G5	WW-12-0208	-42A	0.0	0.3	0.5	0.6	0.8	1.3

Building 586, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		Gross α-Radiation			Gross β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
G6	WW-12-0209	12162-43A	0.3	0.4	0.5	1.1	0.9	1.3
H1	WW-12-0210	-44A	0.1	0.3	0.5	1.0	1.0	1.0
H2	WW-12-0211	-45A	0.3	0.4	0.5	0.3	0.7	1.3
H3	WW-12-0212	-46A	0.4	0.5	0.5	2.0	1.0	1.0
H4	WW-12-0213	-47A	0.6	0.6	0.5	1.0	0.9	1.3
H5	WW-12-0214	-48A	0.3	0.4	0.5	0.4	0.7	1.3
H6	WW-12-0215	-49A	0.4	0.5	0.5	0.7	0.8	1.3
I1	WW-12-0216	-50A	0.3	0.4	0.5	0.9	0.9	1.3
I2	WW-12-0217	12164-01A	0.1	0.3	0.5	3.0	1.0	1.0
I3	WW-12-0218	-02A	0.6	0.6	0.5	2.0	1.0	1.0
I4	WW-12-0219	-03A	0.4	0.5	0.5	1.1	0.9	1.3
I5	WW-12-0220	-04A	0.7	0.6	0.5	- 0.1	0.6	1.3
I6	WW-12-0221	-05A	0.4	0.5	0.5	1.0	0.9	1.3
J1	WW-12-0222	-06A	0.3	0.4	0.5	1.1	0.9	1.3
J2	WW-12-0223	-07A	0.0	0.3	0.5	0.1	0.7	1.3
J3	WW-12-0224	-08A	0.0	0.3	0.5	2.0	1.0	1.0
J4	WW-12-0225	-09A	0.6	0.6	0.5	0.8	0.8	1.3
J5	WW-12-0226	-10A	0.4	0.5	0.5	1.0	0.9	1.3
J6	WW-12-0227	-11A	0.8	0.7	0.5	0.4	0.7	1.3
K1	WW-12-0228	-12A	0.3	0.4	0.5	0.5	0.8	1.3
K2	WW-12-0229	-13A	0.1	0.3	0.5	0.8	0.8	1.3
K3	WW-12-0230	-14A	0.4	0.5	0.5	1.0	0.9	1.3
K4	WW-12-0231	-15A	0.3	0.4	0.5	1.2	0.9	1.3
K5	WW-12-0232	-16A	0.3	0.4	0.5	0.4	0.7	1.3
K6	WW-12-0233	-17A	1.1	0.8	0.5	1.0	1.0	1.0
L1	WW-12-0234	-18A	0.3	0.4	0.5	1.0	0.9	1.3
L2	WW-12-0235	-19A	0.3	0.4	0.5	0.6	0.8	1.3
L3	WW-12-0236	-20A	0.4	0.5	0.5	0.5	0.8	1.3
L4	WW-12-0237	-21A	0.3	0.4	0.5	2.0	1.0	1.0
L5	WW-12-0238	-22A	0.1	0.3	0.5	0.1	0.7	1.3
L6	WW-12-0239	-23A	0.4	0.5	0.5	1.2	0.9	1.3
M1	WW-12-0240	-24A	0.0	0.3	0.5	1.0	1.0	1.0
M2	WW-12-0241	-25A	0.1	0.3	0.5	0.1	0.7	1.3
M3	WW-12-0242	-26A	0.1	0.3	0.5	0.4	0.7	1.3
M4	WW-12-0243	-27A	0.1	0.3	0.5	0.8	0.8	1.3
M5	WW-12-0244	-28A	0.4	0.5	0.5	1.0	1.0	1.0
M6	WW-12-0245	-29A	0.3	0.4	0.5	0.9	0.9	1.3
N1	WW-12-0246	-30A	0.1	0.3	0.5	0.5	0.8	1.3
N2	WW-12-0247	-31A	0.1	0.3	0.5	0.0	0.6	1.3
N3	WW-12-0248	-32A	0.1	0.3	0.5	1.2	0.9	1.3
N4	WW-12-0249	-33A	0.1	0.3	0.5	0.1	0.7	1.3

Building 586, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		Gross α-Radiation			Gross β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
N5	WW-12-0250	12164-34A	0.1	0.3	0.5	- 0.2	0.6	1.3
N6	WW-12-0251	-35A	0.1	0.3	0.5	0.2	0.7	1.3
O1	WW-12-0252	-36A	0.1	0.3	0.5	1.1	0.9	1.3
O2	WW-12-0253	-37A	0.3	0.4	0.5	0.1	0.7	1.3
O3	WW-12-0254	-38A	0.5	0.6	0.5	1.1	0.9	1.3
O4	WW-12-0255	-39A	0.7	0.6	0.5	1.1	0.9	1.3
O5	WW-12-0256	-40A	0.4	0.5	0.5	1.0	0.9	1.3
O6	WW-12-0257	-41A	0.0	0.3	0.5	0.7	0.8	1.3
P1	WW-12-0258	-42A	0.1	0.3	0.5	0.7	0.8	1.3
P2	WW-12-0259	-43A	0.5	0.8	1.3	0.5	0.6	0.5
P3	WW-12-0260	-44A	0.4	0.5	0.5	1.1	0.9	1.3
P4	WW-12-0261	-45A	0.4	0.5	0.5	0.5	0.8	1.3
P5	WW-12-0262	-46A	0.4	0.5	0.5	2.0	1.0	1.0
P6	WW-12-0263	-47A	0.3	0.4	0.5	0.5	0.8	1.3
Q1	WW-12-0264	-48A	0.1	0.3	0.5	0.7	0.8	1.3
Q2	WW-12-0265	-49A	0.0	0.3	0.5	0.1	0.7	1.3
Q3	WW-12-0266	-50A	0.1	0.3	0.5	0.3	0.7	1.3
Q4	WW-12-0267	-51A	0.0	0.3	0.5	1.1	0.9	1.3
Q5	WW-12-0268	-52A	0.3	0.4	0.5	0.6	0.8	1.3
Q6	WW-12-0269	12166-01A	0.1	0.3	0.5	- 0.2	0.6	1.3

Building 587

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		Gross α-Radiation			Gross β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
A1	WW-12-0270	12166-01A	0.1	0.3	0.5	- 0.2	0.6	1.3
A2	WW-12-0271	-02A	0.3	0.4	0.5	0.9	0.9	1.3
A3	WW-12-0272	-03A	0.1	0.3	0.5	0.7	0.8	1.3
A4	WW-12-0273	-04A	0.3	0.4	0.5	0.2	0.7	1.3
A5	WW-12-0274	-05A	0.1	0.3	0.5	0.4	0.7	1.3
A6	WW-12-0275	-06A	0.1	0.3	0.5	1.0	1.0	1.0
B1	WW-12-0276	-07A	0.3	0.4	0.5	2.0	1.0	1.0
B2	WW-12-0277	-08A	0.1	0.3	0.5	0.6	0.8	1.3
B3	WW-12-0278	-09A	0.6	0.6	0.1	0.9	0.9	1.3
B4	WW-12-0279	-10A	0.5	0.6	0.1	3.0	1.0	1.0
B5	WW-12-0280	-11A	0.4	0.5	0.5	1.2	0.9	1.3
B6	WW-12-0281	-12A	0.9	0.7	0.5	3.0	1.0	1.0
C1	WW-12-0282	-13A	0.4	0.5	0.5	1.0	0.9	1.3
C2	WW-12-0283	-14A	0.0	0.3	0.5	0.2	0.7	1.3
C3	WW-12-0284	-15A	0.0	0.3	0.5	1.0	0.9	1.3
C4	WW-12-0285	-16A	0.4	0.5	0.5	0.6	0.8	1.3
C5	WW-12-0286	-17A	0.1	0.3	0.5	1.2	0.9	1.3
C6	WW-12-0287	-18A	1.3	0.8	0.5	2.0	1.0	1.0
D1	WW-12-0288	-19A	1.0	0.3	0.5	1.0	1.0	1.0
D2	WW-12-0288	-20A	0.7	0.6	0.5	1.0	0.9	1.3
D3	WW-12-0290	-21A	0.3	0.4	0.5	2.0	1.0	1.0
D4	WW-12-0291	-22A	0.4	0.5	0.5	0.9	0.9	1.3
D5	WW-12-0292	-23A	0.3	0.4	0.5	2.0	1.0	1.0
D6	WW-12-0293	-24A	0.9	0.7	0.5	2.0	1.0	1.0
E1	WW-12-0294	-25A	0.7	0.6	0.5	0.5	0.8	1.3
E2	WW-12-0295	-26A	0.4	0.5	0.5	0.8	0.8	1.3
E3	WW-12-0296	-27A	0.1	0.3	0.5	1.0	1.0	1.0
E4	WW-12-0297	-28A	1.0	0.8	0.5	2.0	1.0	1.0
E5	WW-12-0297	-29A	0.4	0.5	0.5	1.0	1.0	1.0
E6	WW-12-0299	-30A	1.0	0.8	0.5	2.0	1.0	1.0
F1	WW-12-0300	-31A	0.7	0.6	0.5	1.0	0.9	1.3
F2	WW-12-0301	-32A	0.9	0.7	0.5	2.0	1.0	1.0
F3	WW-12-0302	-33A	0.4	0.5	0.5	0.8	0.8	1.3
F4	WW-12-0303	-34A	0.4	0.5	0.5	2.0	1.0	1.0
F5	WW-12-0304	-35A	0.4	0.5	0.5	1.0	0.9	1.3
F6	WW-12-0305	-36A	0.4	0.5	0.5	2.0	1.0	1.0
G1	WW-12-0306	-37A	0.7	0.6	0.5	2.0	1.0	1.0
G2	WW-12-0307	-38A	0.4	0.5	0.5	1.0	1.0	1.0
G3	WW-12-0308	-39A	1.1	0.8	0.5	0.5	0.8	1.3
G4	WW-12-0309	-40A	0.1	0.3	0.5	2.0	1.0	1.0
G5	WW-12-0310	-41A	0.1	0.3	0.5	2.0	1.0	1.0

Building 587, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		Gross α-Radiation			Gross β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
G6	WW-12-0311	12166-42A	0.5	0.6	0.5	0.2	0.7	1.3
H1	WW-12-0312	-43A	0.7	0.6	0.5	1.0	1.0	1.0
H2	WW-12-0313	-44A	0.9	0.7	0.5	2.0	1.0	1.0
H3	WW-12-0314	-45A	0.4	0.5	0.5	1.0	1.0	1.0
H4	WW-12-0315	-46A	0.7	0.6	0.5	1.2	0.9	1.3
H5	WW-12-0316	-47A	0.3	0.4	0.5	0.7	0.8	1.3
H6	WW-12-0317	-48A	0.0	0.3	0.5	1.0	1.0	1.0
I1	WW-12-0318	-49A	1.4	0.9	0.5	2.0	1.0	1.0
I2	WW-12-0319	-50A	0.4	0.5	0.5	1.1	0.9	1.3
I3	WW-12-0320	12171-01A	0.3	0.4	0.5	0.6	0.8	1.3
I4	WW-12-0321	-02A	0.1	0.3	0.5	0.3	0.7	1.3
I5	WW-12-0322	-03A	0.4	0.5	0.5	1.2	0.9	1.3
I6	WW-12-0323	-04A	0.1	0.3	0.5	0.8	0.8	1.3
J1	WW-12-0324	-05A	0.8	0.7	0.5	2.0	1.0	1.0
J2	WW-12-0325	-06A	0.6	0.6	0.5	1.0	1.0	1.0
J3	WW-12-0326	-07A	0.7	0.6	0.5	0.4	0.7	1.3
J4	WW-12-0327	-08A	0.0	0.3	0.5	0.1	0.7	1.3
J5	WW-12-0328	-09A	0.4	0.5	0.5	0.7	0.8	1.3
J6	WW-12-0329	-10A	0.3	0.4	0.5	1.0	1.0	1.0
K1	WW-12-0330	-11A	0.0	0.3	0.5	2.0	1.0	1.0
K2	WW-12-0331	-12A	0.8	0.7	0.5	0.7	0.8	1.3
K3	WW-12-0332	-13A	0.8	0.7	0.5	1.0	0.9	1.3
K4	WW-12-0333	-14A	0.4	0.5	0.5	1.1	0.9	1.3
K5	WW-12-0334	-15A	0.4	0.5	0.5	2.0	1.0	1.0
K6	WW-12-0335	-16A	0.5	0.6	0.5	2.0	1.0	1.0
L1	WW-12-0336	-17A	0.3	0.4	0.5	2.0	1.0	1.0
L2	WW-12-0337	-18A	0.7	0.6	0.5	2.0	1.0	1.0
L3	WW-12-0338	-19A	0.6	0.6	0.5	0.8	0.8	1.3
L4	WW-12-0339	-20A	0.5	0.6	0.5	2.0	1.0	1.0
L5	WW-12-0340	-21A	1.1	0.8	0.5	1.0	1.0	1.0
L6	WW-12-0341	-22A	0.3	0.4	0.5	2.0	1.0	1.0
M1	WW-12-0342	-23A	0.1	0.3	0.5	1.0	1.0	1.0
M2	WW-12-0343	-24A	0.8	0.7	0.5	2.0	1.0	1.0
M3	WW-12-0344	-25A	0.4	0.5	0.5	1.1	0.9	1.3
M4	WW-12-0345	-26A	0.6	0.6	0.5	2.0	1.0	1.0
M5	WW-12-0346	-27A	0.7	0.6	0.5	1.1	0.9	1.3
M6	WW-12-0347	-28A	0.4	0.5	0.5	0.7	0.8	1.3
N1	WW-12-0348	-29A	1.0	0.7	0.5	2.0	1.0	1.0
N2	WW-12-0349	-30A	0.4	0.5	0.5	0.7	0.8	1.3
N3	WW-12-0350	-31A	0.4	0.5	0.5	2.0	1.0	1.0
N4	WW-12-0351	-32A	1.0	0.7	0.5	1.0	0.9	1.3

Building 587, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
N5	WW-12-0352	12171-33A	0.4	0.5	0.5	2.0	1.0	1.0
N6	WW-12-0353	-34A	0.1	0.3	0.5	0.7	0.8	1.3
O1	WW-12-0354	-35A	0.1	0.3	0.5	2.0	1.0	1.0
O2	WW-12-0355	-36A	0.4	0.5	0.5	0.7	0.8	1.3
O3	WW-12-0356	-37A	0.5	0.6	0.5	2.0	1.0	1.0
O4	WW-12-0357	-38A	0.1	0.3	0.5	1.0	1.0	1.0
O5	WW-12-0358	-39A	0.7	0.6	0.5	0.7	0.8	1.3
O6	WW-12-0359	-40A	0.0	0.3	0.5	- 0.1	0.6	1.3
P1	WW-12-0360	-41A	0.5	0.6	0.5	1.2	0.9	1.3
P2	WW-12-0361	-42A	0.4	0.5	0.5	0.7	0.8	1.3
P3	WW-12-0362	-43A	0.6	0.6	0.5	0.9	0.9	1.3
P4	WW-12-0363	-44A	0.4	0.5	0.5	2.0	1.0	1.0
P5	WW-12-0364	-45A	0.8	0.7	0.5	1.0	1.0	1.0
P6	WW-12-0365	-46A	0.1	0.3	0.5	0.8	0.8	1.3
Q1	WW-12-0366	-47A	0.1	0.3	0.5	0.9	0.9	1.3
Q2	WW-12-0367	-48A	0.1	0.3	0.5	0.9	0.9	1.3
Q3	WW-12-0368	-49A	0.4	0.5	0.5	0.1	0.7	1.3
Q4	WW-12-0369	-50A	0.3	0.4	0.5	0.6	0.8	1.3
Q5	WW-12-0370	-51A	0.6	0.6	0.5	2.0	1.0	1.0
Q6	WW-12-0371	-52A	0.3	0.4	0.5	2.0	1.0	1.0

Building 588

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
A1	WW-12-0372	12175-01A	0.2	0.4	0.8	0.4	0.8	1.4
A3	WW-12-0373	-02A	0.1	0.3	0.8	0.5	0.8	1.4
A5	WW-12-0374	-03A	0.2	0.4	0.7	0.5	0.8	1.4
B2	WW-12-0375	-04A	0.2	0.4	0.7	0.4	0.8	1.4
B4	WW-12-0376	-05A	0.1	0.3	0.8	1.0	1.0	1.0
B6	WW-12-0377	-06A	0.1	0.3	0.8	0.9	0.9	1.4
C1	WW-12-0378	-07A	- 0.1	0.3	0.7	- 0.3	0.6	1.4
C3	WW-12-0379	-08A	0.1	0.3	0.7	0.3	0.7	1.4
C5	WW-12-0380	-09A	- 0.1	0.3	0.8	1.1	0.9	1.4
D2	WW-12-0381	-10A	0.1	0.3	0.8	3.0	1.0	1.0
D4	WW-12-0382	-11A	0.5	0.6	0.7	2.0	1.0	1.0
D6	WW-12-0383	-12A	0.2	0.4	0.7	1.1	0.9	1.4
E1	WW-12-0384	-13A	- 0.1	0.3	0.8	0.7	0.8	1.4
E3	WW-12-0385	-14A	0.4	0.5	0.8	4.0	1.0	1.0
E5	WW-12-0386	-15A	0.2	0.4	0.7	5.0	2.0	1.0
F2	WW-12-0387	-16A	0.1	0.3	0.7	4.0	1.0	1.0
F4	WW-12-0388	-17A	0.5	0.6	0.8	7.0	2.0	1.0
F6	WW-12-0389	-18A	0.8	0.7	0.8	3.0	1.0	1.0
G1	WW-12-0390	-19A	- 0.1	0.3	0.7	2.0	1.0	1.0
G3	WW-12-0391	-20A	0.2	0.4	0.7	2.0	1.0	1.0
G5	WW-12-0392	-21A	0.5	0.6	0.8	5.0	1.0	1.0
H2	WW-12-0393	-22A	0.2	0.4	0.8	2.0	1.0	1.0
H4	WW-12-0394	-23A	0.1	0.3	0.7	5.0	2.0	1.0
H6	WW-12-0395	-24A	0.2	0.4	0.7	2.0	1.0	1.0
I1	WW-12-0396	-25A	0.8	0.7	0.8	4.0	1.0	1.0
I3	WW-12-0397	-26A	0.2	0.4	0.8	2.0	1.0	1.0
I5	WW-12-0398	-27A	4.0	1.0	1.0	10	2.0	1.0
J2	WW-12-0399	-28A	0.6	0.6	0.7	3.0	1.0	1.0
J4	WW-12-0400	-29A	1.2	0.9	0.8	6.0	2.0	1.0
J6	WW-12-0401	-30A	0.5	0.6	0.8	1.0	1.0	1.0
K1	WW-12-0402	-31A	0.9	0.7	0.7	7.0	2.0	1.0
K3	WW-12-0403	-32A	0.1	0.3	0.7	5.0	1.0	1.0
K5	WW-12-0404	-33A	0.1	0.3	0.8	3.0	1.0	1.0
L2	WW-12-0405	-34A	0.4	0.5	0.8	2.0	1.0	1.0
L4	WW-12-0406	-35A	0.1	0.3	0.7	1.0	1.0	1.0
L6	WW-12-0407	-36A	0.3	0.5	0.7	2.0	1.0	1.0
M1	WW-12-0408	-37A	0.5	0.6	0.8	5.0	2.0	1.0
M3	WW-12-0409	-38A	0.4	0.5	0.8	3.0	1.0	1.0
M5	WW-12-0410	-39A	0.2	0.4	0.7	3.0	1.0	1.0
N2	WW-12-0411	-40A	0.3	0.5	0.7	3.0	1.0	1.0
N4	WW-12-0412	-41A	0.1	0.3	0.8	1.0	0.9	1.4

Building 588, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
N6	WW-12-0413	12175-42A	0.1	0.3	0.8	1.0	1.0	1.0
O1	WW-12-0414	-43A	- 0.1	0.3	0.7	0.5	0.8	1.4
O3	WW-12-0415	-44A	0.2	0.4	0.7	1.1	0.9	1.4
O5	WW-12-0416	-45A	- 0.1	0.3	0.8	3.0	1.0	1.0
P2	WW-12-0417	-46A	0.5	0.6	0.8	2.0	1.0	1.0
P4	WW-12-0418	-47A	0.1	0.3	0.7	0.8	0.9	1.4
P6	WW-12-0419	-48A	0.6	0.6	0.7	0.8	0.9	1.4
Q1	WW-12-0420	-49A	- 0.1	0.6	1.4	- 0.1	0.3	0.8
Q3	WW-12-0421	-50A	0.1	0.3	0.8	0.6	0.8	1.4
Q5	WW-12-0422	-51A	- 0.1	0.3	0.7	0.8	0.9	1.4

Building 589

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
A1	WW-12-0423	12178-01A	0.3	0.5	0.7	0.2	0.7	1.4
A3	WW-12-0424	-02A	- 0.1	0.3	0.7	0.1	0.7	1.4
A5	WW-12-0425	-03A	0.2	0.4	0.8	0.6	0.8	1.4
B2	WW-12-0426	-04A	0.4	0.5	0.8	1.0	1.0	1.0
B4	WW-12-0427	-05A	0.3	0.5	0.7	1.0	0.9	1.4
B6	WW-12-0428	-06A	0.2	0.4	0.7	0.9	0.9	1.4
C1	WW-12-0429	-07A	- 0.1	0.3	0.8	0.4	0.8	1.4
C3	WW-12-0430	-08A	1.4	0.9	0.8	1.0	1.0	1.0
C5	WW-12-0431	-09A	0.1	0.3	0.7	2.0	1.0	1.0
D2	WW-12-0432	-10A	0.1	0.3	0.7	2.0	1.0	1.0
D4	WW-12-0433	-11A	0.6	0.6	0.8	2.0	1.0	1.0
D6	WW-12-0434	-12A	0.4	0.5	0.8	1.0	1.0	1.0
E1	WW-12-0435	-13A	0.2	0.4	0.7	2.0	1.0	1.0
E3	WW-12-0436	-14A	- 0.1	0.3	0.7	0.3	0.7	1.4
E5	WW-12-0437	-15A	0.2	0.4	0.8	1.0	1.0	1.0
F2	WW-12-0438	-16A	0.9	0.8	0.8	2.0	1.0	1.0
F4	WW-12-0439	-17A	0.6	0.6	0.7	0.9	0.9	1.4
F6	WW-12-0440	-18A	0.3	0.5	0.7	0.5	0.8	1.4
G1	WW-12-0441	-19A	0.2	0.4	0.8	1.0	0.9	1.4
G3	WW-12-0442	-20A	0.1	0.3	0.8	1.0	1.0	1.0
G5	WW-12-0443	-21A	0.3	0.5	0.7	0.9	0.9	1.4
H2	WW-12-0444	-22A	0.1	0.3	0.7	0.7	0.8	1.4
H4	WW-12-0445	-23A	0.2	0.4	0.8	1.0	1.0	1.0
H6	WW-12-0446	-24A	- 0.1	0.3	0.8	0.7	0.8	1.4
I1	WW-12-0447	-25A	0.2	0.4	0.7	3.0	1.0	1.0
I3	WW-12-0448	-26A	0.2	0.4	0.7	2.0	1.0	1.0
I5	WW-12-0449	-27A	0.4	0.5	0.8	1.1	0.9	1.4
J2	WW-12-0450	-28A	0.1	0.3	0.8	1.0	0.9	1.4
J4	WW-12-0451	-29A	0.3	0.5	0.7	1.1	0.9	1.4
J6	WW-12-0452	-30A	- 0.1	0.3	0.7	0.7	0.8	1.4
K1	WW-12-0453	-31A	0.2	0.4	0.8	1.0	1.0	1.0
K3	WW-12-0454	-32A	0.4	0.5	0.8	1.0	1.0	1.0
K5	WW-12-0455	-33A	0.2	0.4	0.7	0.9	0.9	1.4
L2	WW-12-0456	-34A	0.1	0.3	0.7	2.0	1.0	1.0
L4	WW-12-0457	-35A	0.2	0.4	0.8	2.0	1.0	1.0
L6	WW-12-0458	-36A	0.5	0.6	0.8	2.0	1.0	1.0
M1	WW-12-0459	-37A	0.9	0.7	0.7	1.1	0.9	1.4
M3	WW-12-0460	-38A	0.1	0.3	0.7	2.0	1.0	1.0
M5	WW-12-0461	-39A	0.1	0.3	0.8	3.0	1.0	1.0
N2	WW-12-0462	-40A	0.2	0.4	0.8	2.0	1.0	1.0
N4	WW-12-0463	-41A	0.2	0.4	0.7	2.0	1.0	1.0

Building 589, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
N6	WW-12-0464	12178-42A	0.2	0.4	0.7	2.0	1.0	1.0
O1	WW-12-0465	-43A	0.4	0.5	0.8	0.5	0.8	1.4
O3	WW-12-0466	-44A	0.4	0.5	0.8	2.0	1.0	1.0
O5	WW-12-0467	-45A	0.1	0.3	0.7	2.0	1.0	1.0
P2	WW-12-0468	-46A	0.1	0.3	0.7	1.0	1.0	1.0
P4	WW-12-0469	-47A	0.4	0.5	0.8	1.0	1.0	1.0
P6	WW-12-0470	-48A	0.2	0.4	0.8	0.7	0.8	1.4
Q1	WW-12-0471	-49A	0.3	0.5	0.7	0.8	0.9	1.4
Q3	WW-12-0472	-50A	0.1	0.3	0.7	0.3	0.7	1.4
Q5	WW-12-0473	-51A	0.2	0.4	0.8	0.7	0.8	1.4

Building 590

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
A1	WW-12-0474	12177-01A	0.2	0.4	0.7	0.8	0.9	1.4
A3	WW-12-0475	-02A	0.1	0.3	0.8	0.6	0.8	1.4
A5	WW-12-0476	-03A	0.1	0.3	0.8	0.1	0.7	1.4
B2	WW-12-0477	-04A	0.2	0.4	0.7	0.2	0.7	1.4
B4	WW-12-0478	-05A	0.1	0.3	0.7	0.6	0.8	1.4
B6	WW-12-0479	-06A	0.6	0.6	0.8	2.0	1.0	1.0
C1	WW-12-0480	-07A	- 0.1	0.3	0.8	0.8	0.9	1.4
C3	WW-12-0481	-08A	0.3	0.5	0.7	0.4	0.8	1.4
C5	WW-12-0482	-09A	0.1	0.3	0.7	0.2	0.7	1.4
D2	WW-12-0483	-10A	0.5	0.6	0.8	0.7	0.8	1.4
D4	WW-12-0484	-11A	0.2	0.4	0.8	0.6	0.8	1.4
D6	WW-12-0485	-12A	0.8	0.7	0.7	0.3	0.7	1.4
E1	WW-12-0486	-13A	- 0.1	0.3	0.7	1.0	1.0	1.0
E3	WW-12-0487	-14A	0.8	0.7	0.8	1.1	0.9	1.4
E5	WW-12-0488	-15A	0.9	0.8	0.8	0.7	0.8	1.4
F2	WW-12-0489	-16A	0.2	0.4	0.7	0.4	0.8	1.4
F4	WW-12-0490	-17A	0.8	0.7	0.7	0.8	0.9	1.4
F6	WW-12-0491	-18A	0.5	0.6	0.8	0.8	0.9	1.4
G1	WW-12-0492	-19A	0.1	0.3	0.8	1.1	0.9	1.4
G3	WW-12-0493	-20A	0.8	0.7	0.7	1.0	1.0	1.0
G5	WW-12-0494	-21A	0.3	0.5	0.7	0.5	0.8	1.4
H2	WW-12-0495	-22A	0.4	0.5	0.8	0.9	0.9	1.4
H4	WW-12-0496	-23A	0.4	0.5	0.8	1.0	1.0	1.0
H6	WW-12-0497	-24A	0.1	0.3	0.7	0.3	0.7	1.4
I1	WW-12-0498	-25A	- 0.1	0.3	0.7	0.5	0.8	1.4
I3	WW-12-0499	-26A	0.6	0.6	0.8	1.0	1.0	1.0
I5	WW-12-0500	-27A	0.4	0.5	0.8	1.0	1.0	1.0
J2	WW-12-0501	-28A	0.1	0.3	0.7	0.6	0.8	1.4
J4	WW-12-0502	-29A	0.5	0.6	0.7	0.9	0.9	1.4
J6	WW-12-0503	-30A	0.4	0.5	0.8	- 0.2	0.6	1.4
K1	WW-12-0504	-31A	0.1	0.3	0.8	0.9	0.9	1.4
K3	WW-12-0505	-32A	0.1	0.3	0.7	1.1	0.9	1.4
K5	WW-12-0506	-33A	0.2	0.4	0.7	0.4	0.8	1.4
L2	WW-12-0507	-34A	- 0.1	0.3	0.8	0.4	0.8	1.4
L4	WW-12-0508	-35A	0.6	0.6	0.8	0.4	0.8	1.4
L6	WW-12-0509	-36A	0.2	0.4	0.7	0.3	0.7	1.4
M1	WW-12-0510	-37A	0.6	0.6	0.7	2.0	1.0	1.0
M3	WW-12-0511	-38A	0.4	0.5	0.8	1.0	1.0	1.0
M5	WW-12-0512	-39A	- 0.1	0.3	0.8	0.6	0.8	1.4
N2	WW-12-0513	-40A	- 0.1	0.3	0.7	0.6	0.8	1.4
N4	WW-12-0514	-41A	0.2	0.4	0.7	1.0	0.9	1.4

Building 590, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
N6	WW-12-0515	12177-42A	0.4	0.5	0.8	0.3	0.7	1.4
O1	WW-12-0516	-43A	0.2	0.4	0.8	0.9	0.9	1.4
O3	WW-12-0517	-44A	- 0.1	0.3	0.7	0.5	0.8	1.4
O5	WW-12-0518	-45A	0.1	0.3	0.7	0.0	0.7	1.4
P2	WW-12-0519	-46A	0.4	0.5	0.8	1.1	0.9	1.4
P4	WW-12-0520	-47A	0.2	0.4	0.8	1.0	0.9	1.4
P6	WW-12-0521	-48A	0.1	0.3	0.7	0.3	0.7	1.4
Q1	WW-12-0522	-49A	0.1	0.3	0.7	1.0	1.0	1.0
Q3	WW-12-0523	-50A	0.6	0.6	0.8	0.7	0.8	1.4
Q5	WW-12-0524	-51A	0.2	0.8	0.8	0.3	0.7	1.4

Building 595

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
A1	WW-12-0525	12179-01A	0.1	0.3	0.8	0.8	0.9	1.4
A2	WW-12-0526	-02A	0.2	0.4	0.8	0.5	0.8	1.4
A3	WW-12-0527	-03A	0.3	0.5	0.7	0.9	0.9	1.4
A4	WW-12-0528	-04A	0.1	0.3	0.7	1.1	0.9	1.4
A5	WW-12-0529	-05A	0.2	0.4	0.8	1.0	1.0	1.0
A6	WW-12-0530	-06A	0.6	0.6	0.8	1.0	1.0	1.0
B1	WW-12-0531	-07A	0.2	0.4	0.7	0.0	0.7	1.4
B2	WW-12-0532	-08A	- 0.1	0.3	0.7	0.7	0.8	1.4
B3	WW-12-0533	-09A	0.2	0.4	0.8	2.0	1.0	1.0
B4	WW-12-0534	-10A	0.2	0.4	0.8	1.0	1.0	1.0
B5	WW-12-0535	-11A	0.2	0.4	0.7	2.0	1.0	1.0
B6	WW-12-0536	-12A	0.2	0.4	0.7	1.0	0.9	1.4
C1	WW-12-0537	-13A	0.2	0.4	0.8	0.9	0.9	1.4
C2	WW-12-0538	-14A	0.1	0.3	0.8	0.9	0.9	1.4
C3	WW-12-0539	-15A	- 0.1	0.3	0.7	1.1	0.9	1.4
C4	WW-12-0540	-16A	0.3	0.5	0.7	0.1	0.7	1.4
C5	WW-12-0541	-17A	0.6	0.6	0.8	2.0	1.0	1.0
C6	WW-12-0542	-18A	0.5	0.6	0.8	0.6	0.8	1.4
D1	WW-12-0543	-19A	0.2	0.4	0.7	0.6	0.8	1.4
D2	WW-12-0544	-20A	0.3	0.5	0.7	0.3	0.7	1.4
D3	WW-12-0545	-21A	0.5	0.6	0.8	1.0	1.0	1.0
D4	WW-12-0546	-22A	- 0.1	0.3	0.8	1.1	0.9	1.4
D5	WW-12-0547	-23A	0.5	0.6	0.7	1.0	1.0	1.0
D6	WW-12-0548	-24A	0.2	0.4	0.7	0.6	0.8	1.4
E1	WW-12-0549	-25A	0.2	0.4	0.8	0.5	0.8	1.4
E2	WW-12-0550	-26A	0.1	0.3	0.8	- 0.2	0.6	1.4
E3	WW-12-0551	-27A	0.1	0.3	0.7	1.0	1.0	0.6
E4	WW-12-0552	-28A	0.2	0.4	0.7	0.1	0.7	1.4
E5	WW-12-0553	-29A	0.1	0.3	0.8	0.8	0.9	1.4
E6	WW-12-0554	-30A	0.5	0.6	0.8	0.7	0.8	1.4
F1	WW-12-0555	-31A	0.1	0.3	0.7	0.8	0.9	1.4
F2	WW-12-0556	-32A	0.1	0.3	0.7	0.4	0.8	1.4
F3	WW-12-0557	-33A	0.2	0.4	0.8	0.7	0.8	1.4
F4	WW-12-0558	-34A	0.1	0.3	0.8	0.4	0.8	1.4
F5	WW-12-0559	-35A	0.3	0.5	0.7	1.0	1.0	1.0
F6	WW-12-0560	-36A	0.9	0.7	0.7	0.5	0.8	1.4
G1	WW-12-0561	-37A	0.4	0.5	0.8	2.0	1.0	1.0
G2	WW-12-0562	-38A	0.4	0.5	0.8	1.0	1.0	1.0
G3	WW-12-0563	-39A	0.3	0.5	0.7	2.0	1.0	1.0
G4	WW-12-0564	-40A	0.5	0.6	0.7	0.6	0.8	1.4
G5	WW-12-0565	-41A	0.4	0.5	0.8	0.7	0.8	1.4

Building 595, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
G6	WW-12-0566	12179-42A	0.6	0.6	0.8	2.0	1.0	1.0
H1	WW-12-0567	-43A	0.3	0.5	0.7	2.0	1.0	1.0
H2	WW-12-0568	-44A	0.2	0.4	0.7	2.0	1.0	1.0
H3	WW-12-0569	-45A	0.4	0.5	0.8	2.0	1.0	1.0
H4	WW-12-0570	-46A	0.6	0.6	0.8	1.0	0.9	1.4
H5	WW-12-0571	-47A	0.5	0.6	0.7	1.1	0.9	1.4
H6	WW-12-0572	-48A	0.1	0.3	0.7	0.1	0.7	1.4
I1	WW-12-0573	-49A	0.2	0.4	0.8	0.4	0.8	1.4
I2	WW-12-0574	-50A	0.2	0.4	0.8	- 0.1	0.6	1.4
I3	WW-12-0575	12181-01A	0.2	0.4	0.7	0.7	0.8	1.4
I4	WW-12-0576	-02A	0.8	0.7	0.7	1.1	0.9	1.4
I5	WW-12-0577	-03A	0.2	0.4	0.8	1.0	1.0	1.0
I6	WW-12-0578	-04A	0.2	0.4	0.8	0.8	0.9	1.4
J1	WW-12-0579	-05A	0.1	0.3	0.7	0.3	0.7	1.4
J2	WW-12-0580	-06A	0.2	0.4	0.7	1.1	0.9	1.4
J3	WW-12-0581	-07A	0.5	0.6	0.8	1.0	0.9	1.4
J4	WW-12-0582	-08A	0.2	0.4	0.8	0.6	0.8	1.4
J5	WW-12-0583	-09A	0.6	0.6	0.7	0.4	0.8	1.4
J6	WW-12-0584	-10A	0.1	0.3	0.7	1.0	0.9	1.4
K1	WW-12-0585	-11A	0.6	0.6	0.8	2.0	1.0	1.0
K2	WW-12-0586	-12A	0.8	0.7	0.8	1.1	0.9	1.4
K3	WW-12-0587	-13A	0.8	0.7	0.7	1.0	1.0	1.0
K4	WW-12-0588	-14A	1.0	0.8	0.7	1.0	1.0	1.0
K5	WW-12-0589	-15A	0.4	0.5	0.8	0.8	0.9	1.4
K6	WW-12-0590	-16A	0.8	0.7	0.8	2.0	1.0	1.0
L1	WW-12-0591	-17A	0.3	0.5	0.7	0.8	0.9	1.4
L2	WW-12-0592	-18A	0.8	0.7	0.7	1.0	1.0	1.0
L3	WW-12-0593	-19A	0.9	0.8	0.8	0.9	0.9	1.4
L4	WW-12-0594	-20A	0.8	0.7	0.8	2.0	1.0	1.0
L5	WW-12-0595	-21A	0.5	0.6	0.7	1.0	0.9	1.4
L6	WW-12-0596	-22A	0.5	0.6	0.7	1.0	1.0	1.0
M1	WW-12-0597	-23A	0.9	0.8	0.8	1.0	1.0	1.0
M2	WW-12-0598	-24A	0.4	0.5	0.8	1.0	1.0	1.0
M3	WW-12-0599	-25A	1.0	0.8	0.7	2.0	1.0	1.0
M4	WW-12-0600	-26A	0.6	0.6	0.7	0.5	0.8	1.4
M5	WW-12-0601	-27A	0.6	0.6	0.8	1.1	0.9	1.4
M6	WW-12-0602	-28A	0.2	0.4	0.8	2.0	1.0	1.0
N1	WW-12-0603	-29A	0.3	0.5	0.7	1.0	1.0	1.0
N2	WW-12-0604	-30A	0.9	0.7	0.7	2.0	1.0	1.0
N3	WW-12-0605	-31A	1.2	0.9	0.8	1.0	0.9	1.4
N4	WW-12-0606	-32A	0.2	0.4	0.8	0.6	0.8	1.4

Building 595, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
N5	WW-12-0607	12181-33A	0.3	0.5	0.7	2.0	1.0	1.0
N6	WW-12-0608	-34A	0.1	0.3	0.7	2.0	1.0	1.0
O1	WW-12-0609	-35A	0.2	0.4	0.8	2.0	1.0	1.0
O2	WW-12-0610	-36A	0.8	0.7	0.8	1.0	1.0	1.0
O3	WW-12-0611	-37A	0.3	0.5	0.7	2.0	1.0	1.0
O4	WW-12-0612	-38A	0.3	0.5	0.7	2.0	1.0	1.0
O5	WW-12-0613	-39A	0.1	0.3	0.8	2.0	1.0	1.0
O6	WW-12-0614	-40A	0.2	0.4	0.8	3.0	1.0	1.0
P1	WW-12-0615	-41A	0.2	0.4	0.7	1.0	0.9	1.4
P2	WW-12-0616	-42A	0.5	0.6	0.7	2.0	1.0	1.0
P3	WW-12-0617	-43A	0.5	0.6	0.8	4.0	1.0	1.0
P4	WW-12-0618	-44A	0.5	0.6	0.8	2.0	1.0	1.0
P5	WW-12-0619	-45A	0.2	0.4	0.7	0.7	0.8	1.4
P6	WW-12-0620	-46A	0.1	0.3	0.7	4.0	1.0	1.0
Q1	WW-12-0621	-47A	0.2	0.8	1.4	0.2	0.4	0.8
Q2	WW-12-0622	-48A	0.1	0.3	0.8	1.0	1.0	1.0
Q3	WW-12-0623	-49A	0.1	0.3	0.7	0.0	0.7	1.4
Q4	WW-12-0624	-50A	0.3	0.5	0.7	1.0	1.0	1.0
Q5	WW-12-0625	-51A	0.1	0.3	0.8	2.0	1.0	1.0
Q6	WW-12-0626	-52A	0.1	0.3	0.8	3.0	1.0	1.0

Building 596

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
A1	WW-12-0729	12183-01A	- 0.1	0.3	0.7	- 0.7	0.4	1.4
A2	WW-12-0730	-02A	0.1	0.3	0.7	0.0	0.7	1.4
A3	WW-12-0731	-03A	0.1	0.3	0.8	0.4	0.8	1.4
A4	WW-12-0732	-04A	0.1	0.3	0.8	- 0.1	0.6	1.4
A5	WW-12-0733	-05A	- 0.1	0.3	0.7	1.1	0.9	1.4
A6	WW-12-0734	-06A	0.2	0.4	0.7	0.9	0.9	1.4
B1	WW-12-0735	-07A	0.1	0.3	0.8	0.7	0.8	1.4
B2	WW-12-0736	-08A	0.5	0.6	0.8	0.1	0.7	1.4
B3	WW-12-0737	-09A	0.2	0.4	0.7	0.1	0.7	1.4
B4	WW-12-0738	-10A	- 0.1	0.3	0.7	0.1	0.7	1.4
B5	WW-12-0739	-11A	- 0.1	0.3	0.8	0.2	0.7	1.4
B6	WW-12-0740	-12A	- 0.1	0.3	0.8	0.1	0.7	1.4
C1	WW-12-0741	-13A	0.1	0.3	0.7	0.6	0.8	1.4
C2	WW-12-0742	-14A	0.1	0.3	0.7	0.3	0.7	1.4
C3	WW-12-0743	-15A	0.6	0.6	0.8	0.0	0.7	1.4
C4	WW-12-0744	-16A	- 0.1	0.3	0.8	0.2	0.7	1.4
C5	WW-12-0745	-17A	0.3	0.5	0.7	0.4	0.8	1.4
C6	WW-12-0746	-18A	0.6	0.6	0.7	0.1	0.7	1.4
D1	WW-12-0747	-19A	- 0.1	0.3	0.8	0.5	0.8	1.4
D2	WW-12-0748	-20A	0.2	0.4	0.8	0.5	0.8	1.4
D3	WW-12-0749	-21A	0.5	0.6	0.7	0.8	0.9	1.4
D4	WW-12-0750	-22A	0.3	0.5	0.7	1.0	1.0	1.0
D5	WW-12-0751	-23A	0.1	0.3	0.8	0.2	0.7	1.4
D6	WW-12-0752	-24A	- 0.1	0.3	0.8	0.5	0.8	1.4
E1	WW-12-0753	-25A	- 0.1	0.3	0.7	0.5	0.8	1.4
E2	WW-12-0754	-26A	0.5	0.6	0.7	1.1	0.9	1.4
E3	WW-12-0755	-27A	0.4	0.5	0.8	- 0.4	0.5	1.4
E4	WW-12-0756	-28A	0.5	0.6	0.8	0.3	0.7	1.4
E5	WW-12-0757	-29A	0.2	0.4	0.7	1.0	1.0	1.0
E6	WW-12-0758	-30A	0.2	0.4	0.7	- 0.2	0.6	1.4
F1	WW-12-0759	-31A	0.1	0.3	0.8	0.8	0.9	1.4
F2	WW-12-0760	-32A	- 0.1	0.3	0.8	0.3	0.7	1.4
F3	WW-12-0761	-33A	0.5	0.6	0.7	1.0	0.9	1.4
F4	WW-12-0762	-34A	0.1	0.3	0.7	0.2	0.7	1.4
F5	WW-12-0763	-35A	0.1	0.3	0.8	0.5	0.8	1.4
F6	WW-12-0764	-36A	0.1	0.3	0.8	0.1	0.7	1.4
G1	WW-12-0765	-37A	- 0.1	0.3	0.7	0.0	0.7	1.4
G2	WW-12-0766	-38A	0.2	0.4	0.7	0.1	0.7	1.4
G3	WW-12-0767	-39A	0.4	0.5	0.8	0.1	0.7	1.4
G4	WW-12-0768	-40A	0.2	0.4	0.8	0.7	0.8	1.4
G5	WW-12-0769	-41A	0.5	0.6	0.7	1.0	0.9	1.4

Building 596, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
G6	WW-12-0770	12183-42A	0.5	0.6	1.4	0.0	0.7	1.4
H1	WW-12-0771	-43A	0.4	0.5	0.8	1.0	1.0	1.0
H2	WW-12-0772	-44A	0.6	0.6	0.8	0.3	0.7	1.4
H3	WW-12-0773	-45A	- 0.1	0.3	0.7	- 0.2	0.6	1.4
H4	WW-12-0774	-46A	0.3	0.5	0.7	0.4	0.8	1.4
H5	WW-12-0775	-47A	0.6	0.6	0.8	0.7	0.8	1.4
H6	WW-12-0776	-48A	0.1	0.3	0.8	- 0.2	0.6	1.4
I1	WW-12-0777	-49A	0.5	0.6	0.7	0.3	0.7	1.4
I2	WW-12-0778	-50A	0.5	0.6	0.7	0.6	0.8	1.4
I3	WW-12-0779	12194-01A	0.6	0.6	0.8	0.6	0.8	1.4
I4	WW-12-0780	-02A	0.2	0.4	0.8	0.5	0.8	1.4
I5	WW-12-0781	-03A	- 0.1	0.3	0.7	0.0	0.7	1.4
I6	WW-12-0782	-04A	0.5	0.6	0.7	0.5	0.8	1.4
J1	WW-12-0783	-05A	0.5	0.6	0.8	1.0	0.9	1.4
J2	WW-12-0784	-06A	0.2	0.4	0.8	1.0	0.9	1.4
J3	WW-12-0785	-07A	- 0.1	0.3	0.7	0.2	0.7	1.4
J4	WW-12-0786	-08A	0.1	0.3	0.7	0.0	0.7	1.4
J5	WW-12-0787	-09A	0.3	0.5	0.8	0.2	0.7	1.4
J6	WW-12-0788	-10A	0.6	0.6	0.8	0.2	0.7	1.4
K1	WW-12-0789	-11A	- 0.1	0.3	0.7	0.6	0.8	1.4
K2	WW-12-0790	-12A	0.2	0.4	0.7	- 0.1	0.6	1.4
K3	WW-12-0791	-13A	0.5	0.6	1.4	- 0.3	0.6	1.4
K4	WW-12-0792	-14A	0.1	0.3	0.8	0.1	0.7	1.4
K5	WW-12-0793	-15A	0.2	0.4	0.7	0.7	0.8	1.4
K6	WW-12-0794	-16A	0.1	0.3	0.7	0.3	0.7	1.4
L1	WW-12-0795	-17A	0.2	0.4	0.8	1.0	0.9	1.4
L2	WW-12-0796	-18A	0.2	0.4	0.8	0.7	0.8	0.6
L3	WW-12-0797	-19A	0.2	0.4	0.7	0.3	0.7	1.4
L4	WW-12-0798	-20A	0.3	0.5	0.7	1.0	0.9	1.4
L5	WW-12-0799	-21A	0.3	0.5	0.8	0.7	0.8	1.4
L6	WW-12-0800	-22A	0.1	0.3	0.8	0.0	0.7	1.4
M1	WW-12-0801	-23A	0.6	0.6	0.7	0.8	0.9	1.4
M2	WW-12-0802	-24A	0.3	0.5	0.7	0.9	0.9	1.4
M3	WW-12-0803	-25A	0.2	0.4	0.8	1.0	0.9	1.4
M4	WW-12-0804	-26A	- 0.1	0.3	0.8	0.1	00.7	1.4
M5	WW-12-0805	-27A	4.0	1.0	1.0	3.0	1.0	1.0
M6	WW-12-0806	-28A	0.8	0.7	0.7	1.0	1.0	1.0
N1	WW-12-0807	-29A	0.2	0.4	0.8	0.2	0.7	1.4
N2	WW-12-0808	-30A	0.1	0.3	0.8	1.0	1.0	1.0
N3	WW-12-0809	-31A	0.3	0.5	0.7	1.1	0.9	1.4
N4	WW-12-0810	-32A	0.3	0.5	0.7	0.2	0.7	1.4

Building 596, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
N5	WW-12-0811	12194-33A	0.2	0.4	0.8	1.0	1.0	1.0
N6	WW-12-0812	-34A	- 0.1	0.3	0.8	0.3	0.7	1.4
O1	WW-12-0813	-35A	- 0.1	0.3	0.7	0.1	0.7	1.4
O2	WW-12-0814	-36A	0.1	0.3	0.7	0.5	0.8	1.4
O3	WW-12-0815	-37A	0.8	0.7	0.8	1.0	0.9	1.4
O4	WW-12-0816	-38A	0.2	0.4	0.8	0.6	0.8	1.4
O5	WW-12-0817	-39A	0.6	0.6	0.7	0.8	0.9	1.4
O6	WW-12-0818	-40A	- 0.1	0.3	0.7	1.0	1.0	1.0
P1	WW-12-0819	-41A	0.2	0.4	0.8	0.4	0.8	1.4
P2	WW-12-0820	-42A	0.1	0.3	0.8	1.0	1.0	1.0
P3	WW-12-0821	-43A	0.1	0.3	0.7	0.5	0.8	1.4
P4	WW-12-0822	-44A	- 0.1	0.3	0.7	0.6	0.8	1.4
P5	WW-12-0823	-45A	0.5	0.6	0.8	2.0	1.0	1.0
P6	WW-12-0824	-46A	0.1	0.3	0.8	0.7	0.8	1.4
Q1	WW-12-0825	-47A	0.5	0.6	0.7	1.0	1.0	1.0
Q2	WW-12-0826	-48A	0.3	0.5	0.7	1.0	0.9	1.4
Q3	WW-12-0827	-49A	0.3	0.5	0.8	0.2	0.7	1.4
Q4	WW-12-0828	-50A	0.2	0.4	0.8	0.0	0.7	1.4
Q5	WW-12-0829	-51A	0.2	0.4	0.7	0.4	0.8	1.4
Q6	WW-12-0830	-52A	0.1	0.3	0.7	0.1	0.7	1.4

Building 597

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
A1	WW-12-0831	12196-01A	0.1	0.3	0.8	0.9	0.9	1.4
A2	WW-12-0832	-02A	0.3	0.5	0.8	0.5	0.8	1.4
A3	WW-12-0833	-03A	0.2	0.4	0.7	0.2	0.7	1.4
A4	WW-12-0834	-04A	- 0.1	0.3	0.7	0.0	0.7	1.4
A5	WW-12-0835	-05A	0.3	0.5	0.8	0.5	0.8	1.4
A6	WW-12-0836	-06A	- 0.1	0.3	0.8	1.1	0.9	1.4
B1	WW-12-0837	-07A	0.1	0.3	0.7	0.7	0.8	1.4
B2	WW-12-0838	-08A	- 0.1	0.3	0.7	0.2	0.7	1.4
B3	WW-12-0839	-09A	0.1	0.3	0.8	- 0.2	0.6	1.4
B4	WW-12-0840	-10A	0.3	0.5	0.8	- 0.6	0.5	1.4
B5	WW-12-0841	-11A	0.1	0.3	0.7	0.1	0.7	1.4
B6	WW-12-0842	-12A	0.1	0.3	0.7	0.5	0.8	1.4
C1	WW-12-0843	-13A	0.2	0.4	0.8	2.0	1.0	1.0
C2	WW-12-0844	-14A	0.1	0.3	0.8	0.1	0.7	1.4
C3	WW-12-0845	-15A	0.5	0.6	0.7	0.5	0.8	1.4
C4	WW-12-0846	-16A	0.2	0.4	0.7	1.1	0.9	1.4
C5	WW-12-0847	-17A	0.3	0.5	0.8	0.9	0.9	1.4
C6	WW-12-0848	-18A	0.6	0.6	0.8	0.6	0.8	1.4
D1	WW-12-0849	-19A	0.2	0.4	0.7	0.6	0.8	1.4
D2	WW-12-0850	-20A	0.3	0.5	0.7	0.6	0.8	1.4
D3	WW-12-0851	-21A	- 0.1	0.3	0.8	0.2	0.7	1.4
D4	WW-12-0852	-22A	0.5	0.6	0.8	0.6	0.8	1.4
D5	WW-12-0853	-23A	- 0.1	0.3	0.7	0.4	0.8	1.4
D6	WW-12-0854	-24A	0.2	0.4	0.7	0.8	0.9	1.4
E1	WW-12-0855	-25A	0.5	0.6	0.8	3.0	1.0	1.0
E2	WW-12-0856	-26A	0.8	0.7	0.8	0.2	0.7	1.4
E3	WW-12-0857	-27A	0.3	0.5	0.7	1.0	1.0	1.0
E4	WW-12-0858	-28A	0.5	0.6	0.7	0.7	0.8	1.4
E5	WW-12-0859	-29A	0.1	0.3	0.8	1.1	0.9	1.4
E6	WW-12-0860	-30A	0.1	0.3	0.8	0.1	0.7	1.4
F1	WW-12-0861	-31A	0.3	0.5	0.7	2.0	1.0	1.0
F2	WW-12-0862	-32A	0.2	0.4	0.7	0.5	0.8	1.4
F3	WW-12-0863	-33A	0.2	0.4	0.8	2.0	1.0	1.0
F4	WW-12-0864	-34A	0.1	0.3	0.8	0.2	0.7	1.4
F5	WW-12-0865	-35A	1.3	0.9	0.7	- 0.3	0.6	1.4
F6	WW-12-0866	-36A	0.2	0.4	0.7	0.1	0.7	1.4
G1	WW-12-0867	-37A	0.3	0.5	0.8	2.0	1.0	1.0
G2	WW-12-0868	-38A	0.2	0.4	0.8	1.0	1.0	1.0
G3	WW-12-0869	-39A	- 0.1	0.3	0.7	0.3	0.7	1.4
G4	WW-12-0870	-40A	0.2	0.4	0.7	0.4	0.8	1.4
G5	WW-12-0871	-41A	0.2	0.4	0.8	2.0	1.0	1.0

Building 597, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
G6	WW-12-0872	12196-42A	0.2	0.4	0.8	0.2	0.7	1.4
H1	WW-12-0873	-43A	1.0	0.8	0.7	0.7	0.8	1.4
H2	WW-12-0874	-44A	0.3	0.5	0.7	1.1	0.9	1.4
H3	WW-12-0875	-45A	0.2	0.4	0.8	0.7	0.8	1.4
H4	WW-12-0876	-46A	0.2	0.4	0.8	0.4	0.8	1.4
H5	WW-12-0877	-47A	0.2	0.4	0.7	0.5	0.8	1.4
H6	WW-12-0878	-48A	0.1	0.3	0.7	0.4	0.8	1.4
I1	WW-12-0879	-49A	0.2	0.4	0.8	1.0	1.0	1.0
I2	WW-12-0880	-50A	0.5	0.6	0.8	1.0	1.0	1.0
I3	WW-12-0881	12197-01A	0.3	0.5	0.7	0.5	0.8	1.4
I4	WW-12-0882	-02A	0.6	0.6	0.7	1.0	1.0	1.0
I5	WW-12-0883	-03A	0.2	0.4	0.8	0.7	0.8	1.4
I6	WW-12-0884	-04A	0.5	0.6	0.8	1.1	0.9	1.4
J1	WW-12-0885	-05A	0.1	0.3	0.7	2.0	1.0	1.0
J2	WW-12-0886	-06A	0.2	0.4	0.7	0.4	0.8	1.4
J3	WW-12-0887	-07A	0.8	0.7	0.8	2.0	1.0	1.0
J4	WW-12-0888	-08A	- 0.1	0.3	0.8	0.2	0.7	1.4
J5	WW-12-0889	-09A	0.2	0.4	0.7	0.6	0.8	1.4
J6	WW-12-0890	-10A	- 0.1	0.3	0.7	0.1	0.7	1.4
K1	WW-12-0891	-11A	0.1	0.3	0.8	1.0	1.0	1.0
K2	WW-12-0892	-12A	0.2	0.4	0.8	0.0	0.7	1.4
K3	WW-12-0893	-13A	0.2	0.4	0.7	- 0.1	0.6	1.4
K4	WW-12-0894	-14A	0.8	0.7	0.7	0.5	0.8	1.4
K5	WW-12-0895	-15A	0.2	0.4	0.8	0.0	0.7	1.4
K6	WW-12-0896	-16A	- 0.1	0.3	0.8	0.3	0.7	1.4
L1	WW-12-0897	-17A	0.1	0.3	0.7	0.2	0.7	1.4
L2	WW-12-0898	-18A	0.1	0.3	0.7	0.9	0.9	1.4
L3	WW-12-0899	-19A	0.6	0.6	0.8	0.9	0.9	1.4
L4	WW-12-0900	-20A	0.1	0.3	0.8	1.0	1.0	1.0
L5	WW-12-0901	-21A	0.3	0.5	0.7	- 0.2	0.6	1.4
L6	WW-12-0902	-22A	0.1	0.3	0.7	0.4	0.8	1.4
M1	WW-12-0903	-23A	0.1	0.3	0.8	0.6	0.8	1.4
M2	WW-12-0904	-24A	0.5	0.6	0.8	0.6	0.8	1.4
M3	WW-12-0905	-25A	0.5	0.6	0.7	0.4	0.8	1.4
M4	WW-12-0906	-26A	0.8	0.7	0.7	2.0	1.0	1.0
M5	WW-12-0907	-27A	0.2	0.4	0.8	0.9	0.9	1.4
M6	WW-12-0908	-28A	0.2	0.4	0.8	0.0	0.7	1.4
N1	WW-12-0909	-29A	0.2	0.4	0.7	1.0	0.9	1.4
N2	WW-12-0910	-30A	0.6	0.6	0.7	0.8	0.9	1.4
N3	WW-12-0911	-31A	0.2	0.4	0.8	1.0	1.0	1.0
N4	WW-12-0912	-32A	0.1	0.3	0.8	0.4	0.8	1.4

Building 597, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
N5	WW-12-0913	12197-33A	0.6	0.6	0.7	0.9	0.9	0.6
N6	WW-12-0914	-34A	0.2	0.4	0.7	0.5	0.8	1.4
O1	WW-12-0915	-35A	0.6	0.6	0.8	2.0	1.0	1.0
O2	WW-12-0916	-36A	0.1	0.3	0.8	0.1	0.7	1.4
O3	WW-12-0917	-37A	0.5	0.6	0.7	0.0	0.7	1.4
O4	WW-12-0918	-38A	0.1	0.3	0.7	0.2	0.7	1.4
O5	WW-12-0919	-39A	0.5	0.6	0.8	0.9	0.9	1.4
O6	WW-12-0920	-40A	0.1	0.3	0.8	0.3	0.7	1.4
P1	WW-12-0921	-41A	0.1	0.3	0.7	- 0.2	0.6	1.4
P2	WW-12-0922	-42A	0.2	0.4	0.7	0.0	0.7	1.4
P3	WW-12-0923	-43A	0.3	0.5	0.8	0.1	0.7	1.4
P4	WW-12-0924	-44A	0.2	0.4	0.8	0.5	0.8	1.4
P5	WW-12-0925	-45A	- 0.1	0.3	0.7	0.6	0.8	1.4
P6	WW-12-0926	-46A	0.2	0.4	0.7	0.6	0.8	1.4
Q1	WW-12-0927	-47A	0.1	0.3	0.8	0.7	0.8	1.4
Q2	WW-12-0928	-48A	0.1	0.3	0.8	0.1	0.7	1.4
Q3	WW-12-0929	-49A	0.1	0.3	0.7	0.2	0.7	1.4
Q4	WW-12-0930	-50A	0.2	0.4	0.7	0.1	0.7	1.4
Q5	WW-12-0931	-51A	0.1	0.3	0.8	- 0.1	0.6	1.4
Q6	WW-12-0932	-52A	0.3	0.5	0.8	0.2	0.7	1.4

Building 598

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
A1	WW-12-0933	12199-01A	- 0.1	0.3	0.7	0.2	0.7	1.4
A2	WW-12-0934	-02A	0.2	0.4	0.7	0.3	0.7	1.4
A3	WW-12-0935	-03A	0.3	0.5	0.8	0.6	0.8	1.4
A4	WW-12-0936	-04A	- 0.1	0.3	0.8	0.5	0.8	1.4
A5	WW-12-0937	-05A	0.1	0.3	0.7	0.1	0.7	1.4
A6	WW-12-0938	-06A	0.2	0.4	0.7	- 0.2	0.6	1.4
B1	WW-12-0939	-07A	0.1	0.3	0.8	- 0.1	0.6	1.4
B2	WW-12-0940	-08A	0.3	0.5	0.8	0.2	0.7	1.4
B3	WW-12-0941	-09A	- 0.1	0.3	0.7	- 0.3	0.6	1.4
B4	WW-12-0942	-10A	0.1	0.3	0.7	- 0.6	0.5	1.4
B5	WW-12-0943	-11A	0.2	0.4	0.8	0.3	0.7	1.4
B6	WW-12-0944	-12A	- 0.1	0.3	0.8	0.6	0.8	1.4
C1	WW-12-0945	-13A	- 0.1	0.3	0.7	- 0.2	0.6	1.4
C2	WW-12-0946	-14A	- 0.1	0.3	0.7	0.4	0.8	1.4
C3	WW-12-0947	-15A	- 0.1	0.3	0.8	1.0	0.9	1.4
C4	WW-12-0948	-16A	0.2	0.4	0.8	- 0.3	0.6	1.4
C5	WW-12-0949	-17A	0.5	0.6	0.7	0.7	0.8	1.4
C6	WW-12-0950	-18A	0.8	0.7	0.7	0.5	0.8	1.4
D1	WW-12-0951	-19A	0.3	0.5	0.8	- 0.1	0.6	1.4
D2	WW-12-0952	-20A	0.2	0.4	0.8	0.8	0.9	1.4
D3	WW-12-0953	-21A	0.2	0.4	0.7	0.3	0.7	1.4
D4	WW-12-0954	-22A	0.3	0.5	0.7	0.6	0.8	1.4
D5	WW-12-0955	-23A	0.1	0.3	0.8	0.6	0.8	1.4
D6	WW-12-0956	-24A	- 0.1	0.3	0.8	0.5	0.8	1.4
E1	WW-12-0957	-25A	0.2	0.4	0.7	- 0.5	0.5	1.4
E2	WW-12-0958	-26A	0.3	0.5	0.7	0.2	0.7	1.4
E3	WW-12-0959	-27A	0.6	0.6	0.8	0.4	0.8	1.4
E4	WW-12-0960	-28A	0.2	0.4	0.8	0.6	0.8	1.4
E5	WW-12-0961	-29A	0.3	0.5	0.7	0.9	0.9	1.4
E6	WW-12-0962	-30A	0.2	0.4	0.7	0.7	0.8	1.4
F1	WW-12-0963	-31A	- 0.1	0.3	0.8	0.5	0.8	1.4
F2	WW-12-0964	-32A	0.5	0.6	0.8	1.0	1.0	1.0
F3	WW-12-0965	-33A	0.1	0.3	0.7	1.0	0.9	1.4
F4	WW-12-0966	-34A	0.2	0.4	0.7	0.1	0.7	1.4
F5	WW-12-0967	-35A	0.5	0.6	0.8	2.0	1.0	1.0
F6	WW-12-0968	-36A	- 0.1	0.3	0.8	1.1	0.9	1.4
G1	WW-12-0969	-37A	0.2	0.4	0.7	0.8	0.9	1.4
G2	WW-12-0970	-38A	0.2	0.4	0.7	0.5	0.8	1.4
G3	WW-12-0971	-39A	0.1	0.3	0.8	0.9	0.9	1.4
G4	WW-12-0972	-40A	0.2	0.4	0.8	0.3	0.7	1.4
G5	WW-12-0973	-41A	- 0.1	0.3	0.7	0.6	0.8	1.4

Building 598, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
G6	WW-12-0974	12199-42A	- 0.1	0.3	0.7	0.3	0.7	1.4
H1	WW-12-0975	-43A	0.5	0.6	0.8	1.0	1.0	1.0
H2	WW-12-0976	-44A	0.2	0.4	0.8	1.0	0.9	1.4
H3	WW-12-0977	-45A	1.0	0.8	0.7	1.0	0.9	1.4
H4	WW-12-0978	-46A	0.5	0.6	0.7	1.0	1.0	1.0
H5	WW-12-0979	-47A	0.3	0.5	0.8	2.0	1.0	1.0
H6	WW-12-0980	-48A	- 0.1	0.3	0.8	1.0	1.0	1.0
I1	WW-12-0981	-49A	0.2	0.4	0.7	2.0	1.0	1.0
I2	WW-12-0982	-50A	0.1	0.3	0.7	0.3	0.7	1.4
I3	WW-12-0983	12200-01A	0.8	0.7	0.8	1.0	1.0	1.0
I4	WW-12-0984	-02A	0.5	0.6	0.8	0.6	0.8	1.4
I5	WW-12-0985	-03A	0.3	0.5	0.7	2.0	1.0	1.0
I6	WW-12-0986	-04A	0.3	0.5	0.7	2.0	1.0	1.0
J1	WW-12-0987	-05A	0.6	0.6	0.8	1.0	0.9	1.4
J2	WW-12-0988	-06A	0.3	0.5	0.8	0.5	0.8	1.4
J3	WW-12-0989	-07A	0.1	0.3	0.7	2.0	1.0	1.0
J4	WW-12-0990	-08A	0.1	0.3	1.4	1.0	0.9	1.4
J5	WW-12-0991	-09A	0.5	0.6	0.8	3.0	1.0	1.0
J6	WW-12-0992	-10A	0.1	0.3	0.8	0.7	0.8	1.4
K1	WW-12-0993	-11A	- 0.1	0.3	0.7	0.6	0.8	1.4
K2	WW-12-0994	-12A	0.1	0.3	0.7	1.1	0.9	1.4
K3	WW-12-0995	-13A	0.3	0.5	0.8	0.7	0.8	1.4
K4	WW-12-0996	-14A	0.3	0.5	0.8	1.0	1.0	1.0
K5	WW-12-0997	-15A	0.3	0.5	0.7	2.0	1.0	1.0
K6	WW-12-0998	-16A	- 0.1	0.3	0.7	0.8	0.9	1.4
L1	WW-12-0999	-17A	- 0.1	0.3	0.8	- 0.3	0.6	1.4
L2	WW-12-1000	-18A	0.6	0.6	0.8	1.0	1.0	1.0
L3	WW-12-1001	-19A	0.9	0.7	0.7	1.0	0.9	1.4
L4	WW-12-1002	-20A	0.5	0.6	0.7	1.0	0.9	1.4
L5	WW-12-1003	-21A	- 0.1	0.3	0.8	3.0	1.0	1.0
L6	WW-12-1004	-22A	0.1	0.3	0.8	0.6	0.8	1.4
M1	WW-12-1005	-23A	0.1	0.3	0.7	0.2	0.7	1.4
M2	WW-12-1006	-24A	0.6	0.6	0.7	0.6	0.8	1.4
M3	WW-12-1007	-25A	0.1	0.3	0.8	2.0	1.0	1.0
M4	WW-12-1008	-26A	0.1	0.3	0.8	3.0	1.0	1.0
M5	WW-12-1009	-27A	0.2	0.4	0.7	0.5	0.8	1.4
M6	WW-12-1010	-28A	- 0.1	0.3	0.7	0.9	0.9	1.4
N1	WW-12-1011	-29A	0.1	0.3	0.8	0.4	0.8	1.4
N2	WW-12-1012	-30A	0.2	0.4	0.8	2.0	1.0	1.0
N3	WW-12-1013	-31A	0.2	0.4	0.7	2.0	1.0	1.0
N4	WW-12-1014	-32A	0.2	0.4	0.7	0.7	0.8	1.4

Building 598, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
N5	WW-12-1015	12200-33A	0.8	0.7	0.8	1.0	1.0	1.0
N6	WW-12-1016	-34A	0.2	0.4	0.8	2.0	1.0	1.0
O1	WW-12-1017	-35A	- 0.1	0.3	0.7	0.7	0.8	1.4
O2	WW-12-1018	-36A	0.2	0.4	0.7	0.0	0.7	1.4
O3	WW-12-1019	-37A	0.1	0.3	0.8	1.0	1.0	1.0
O4	WW-12-1020	-38A	- 0.1	0.3	0.8	0.4	0.8	1.4
O5	WW-12-1021	-39A	0.5	0.6	0.7	- 0.5	0.5	1.4
O6	WW-12-1022	-40A	- 0.1	0.3	0.7	0.0	0.7	1.4
P1	WW-12-1023	-41A	0.3	0.5	0.8	0.8	0.9	1.4
P2	WW-12-1024	-42A	0.6	0.6	0.8	0.4	0.8	1.4
P3	WW-12-1025	-43A	0.8	0.7	0.7	0.5	0.8	1.4
P4	WW-12-1026	-44A	0.2	0.4	0.7	0.2	0.7	1.4
P5	WW-12-1027	-45A	0.5	0.6	0.7	1.1	0.9	1.4
P6	WW-12-1028	-46A	0.3	0.5	0.8	- 0.2	0.6	1.4
Q1	WW-12-1029	-47A	0.3	0.5	0.7	0.1	0.7	1.4
Q2	WW-12-1030	-48A	0.2	0.4	0.7	0.3	0.7	1.4
Q3	WW-12-1031	-49A	0.3	0.5	0.8	1.0	1.0	1.0
Q4	WW-12-1032	-50A	0.2	0.4	0.8	0.2	0.7	1.4
Q5	WW-12-1033	-51A	0.1	0.3	0.7	1.0	1.0	1.0
Q6	WW-12-1034	-52A	- 0.1	0.3	0.7	0.2	0.7	1.4

Building 599

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
A1	WW-12-0627	12237-01A	- 0.1	0.3	0.7	- 0.7	0.4	1.3
A2	WW-12-0628	-02A	- 0.1	0.3	0.7	0.4	0.7	1.3
A3	WW-12-0629	-03A	0.1	0.3	0.7	0.4	0.7	1.3
A4	WW-12-0630	-04A	- 0.1	0.3	0.7	0.5	0.8	1.3
A5	WW-12-0631	-05A	- 0.1	0.3	0.7	0.0	0.6	1.3
A6	WW-12-0632	-06A	0.2	0.4	0.7	0.8	0.8	1.3
B1	WW-12-0633	-07A	- 0.1	0.3	0.7	- 0.2	0.6	1.3
B2	WW-12-0634	-08A	0.1	0.3	0.7	- 0.1	0.6	1.3
B3	WW-12-0635	-09A	0.4	0.5	0.7	- 0.5	0.5	1.3
B4	WW-12-0636	-10A	0.1	0.3	0.7	- 0.2	0.6	1.3
B5	WW-12-0637	-11A	- 0.1	0.3	0.7	- 0.6	0.4	1.3
B6	WW-12-0638	-12A	0.2	0.4	0.7	0.3	0.7	1.3
C1	WW-12-0639	-13A	0.1	0.3	0.7	0.1	0.7	1.3
C2	WW-12-0640	-14A	0.1	0.3	0.7	- 0.3	0.5	1.3
C3	WW-12-0641	-15A	0.1	0.3	0.7	- 0.3	0.5	1.3
C4	WW-12-0642	-16A	0.1	0.3	0.7	0.2	0.7	1.3
C5	WW-12-0643	-17A	- 0.1	0.3	0.7	- 0.3	0.5	1.3
C6	WW-12-0644	-18A	0.2	0.4	0.7	0.7	0.8	1.3
D1	WW-12-0645	-19A	0.1	0.3	0.7	- 0.6	0.4	1.3
D2	WW-12-0646	-20A	0.5	0.6	0.7	- 0.3	0.5	1.3
D3	WW-12-0647	-21A	- 0.1	0.3	0.7	- 0.5	0.5	1.3
D4	WW-12-0648	-22A	0.4	0.5	0.7	0.0	0.6	1.3
D5	WW-12-0649	-23A	0.1	0.3	0.7	- 0.5	0.5	1.3
D6	WW-12-0650	-24A	- 0.1	0.3	0.7	0.8	0.8	1.3
E1	WW-12-0651	-25A	0.1	0.3	0.7	0.2	0.7	1.3
E2	WW-12-0652	-26A	- 0.1	0.3	0.7	- 0.3	0.5	1.3
E3	WW-12-0653	-27A	0.2	0.4	0.7	0.7	0.8	1.3
E4	WW-12-0654	-28A	- 0.1	0.3	0.7	0.2	0.7	1.3
E5	WW-12-0655	-29A	0.1	0.3	0.7	0.6	0.8	1.3
E6	WW-12-0656	-30A	0.1	0.3	0.7	0.7	0.8	1.3
F1	WW-12-0657	-31A	0.1	0.3	0.7	0.2	0.7	1.3
F2	WW-12-0658	-32A	- 0.1	0.3	0.7	0.5	0.8	1.3
F3	WW-12-0659	-33A	0.1	0.3	0.7	0.4	0.7	1.3
F4	WW-12-0660	-34A	0.2	0.4	0.7	0.1	0.7	1.3
F5	WW-12-0661	-35A	0.2	0.4	0.7	0.8	0.8	1.3
F6	WW-12-0662	-36A	0.2	0.4	0.7	2.0	1.0	1.0
G1	WW-12-0663	-37A	- 0.1	0.3	0.7	0.2	0.7	1.3
G2	WW-12-0664	-38A	- 0.1	0.3	0.7	1.0	0.9	1.3
G3	WW-12-0665	-39A	0.1	0.3	0.7	0.1	0.7	1.3
G4	WW-12-0666	-40A	0.4	0.5	0.7	0.1	0.7	1.3
G5	WW-12-0667	-41A	0.2	0.4	0.7	2.0	1.0	1.0

Building 599, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
G6	WW-12-0668	12237-42A	0.2	0.4	0.7	2.0	1.0	1.0
H1	WW-12-0669	-43A	- 0.1	0.3	0.7	- 0.3	0.5	1.3
H2	WW-12-0670	-44A	- 0.1	0.3	0.7	0.6	0.8	1.3
H3	WW-12-0671	-45A	- 0.1	0.3	0.7	- 0.2	0.6	1.3
H4	WW-12-0672	-46A	0.1	0.3	0.7	2.0	1.0	1.0
H5	WW-12-0673	-47A	0.1	0.3	0.7	1.2	0.9	1.3
H6	WW-12-0674	-48A	0.4	0.5	0.7	0.9	0.9	1.3
I1	WW-12-0675	-49A	0.1	0.3	0.7	0.4	0.7	1.3
I2	WW-12-0676	-50A	0.2	0.4	0.7	- 0.2	0.6	1.3
I3	WW-12-0677	12240-01A	- 0.1	0.3	0.7	0.1	0.7	1.3
I4	WW-12-0678	-02A	- 0.1	0.3	0.7	1.0	1.0	1.0
I5	WW-12-0679	-03A	0.4	0.5	0.7	2.0	1.0	1.0
I6	WW-12-0680	-04A	- 0.1	0.3	0.7	0.5	0.8	1.3
J1	WW-12-0681	-05A	- 0.1	0.3	0.7	- 0.1	0.6	1.3
J2	WW-12-0682	-06A	- 0.1	0.3	0.7	0.5	0.8	1.3
J3	WW-12-0683	-07A	0.4	0.5	0.7	0.1	0.7	1.3
J4	WW-12-0684	-08A	0.4	0.5	0.7	2.0	1.0	1.0
J5	WW-12-0685	-09A	0.4	0.5	0.7	2.0	1.0	1.0
J6	WW-12-0686	-10A	0.2	0.4	0.7	2.0	1.0	1.0
K1	WW-12-0687	-11A	0.2	0.4	0.7	- 0.3	0.5	1.3
K2	WW-12-0688	-12A	- 0.1	0.3	0.7	0.1	0.7	1.3
K3	WW-12-0689	-13A	- 0.1	0.3	0.7	0.1	0.7	1.3
K4	WW-12-0690	-14A	0.4	0.5	0.7	1.1	0.9	1.3
K5	WW-12-0691	-15A	0.2	0.4	0.7	1.0	0.9	1.3
K6	WW-12-0692	-16A	- 0.1	0.3	0.7	2.0	1.0	1.0
L1	WW-12-0693	-17A	0.1	0.3	0.7	0.8	0.8	1.3
L2	WW-12-0694	-18A	0.1	0.3	0.7	0.3	0.7	1.3
L3	WW-12-0695	-19A	0.1	0.3	0.7	0.6	0.8	1.3
L4	WW-12-0696	-20A	0.2	0.4	0.7	1.2	0.9	1.3
L5	WW-12-0697	-21A	0.1	0.3	0.7	1.0	0.9	1.3
L6	WW-12-0698	-22A	0.2	0.4	0.7	1.0	0.9	1.3
M1	WW-12-0699	-23A	0.1	0.3	0.7	0.0	0.6	1.3
M2	WW-12-0700	-24A	0.2	0.4	0.7	- 0.2	0.6	1.3
M3	WW-12-0701	-25A	- 0.1	0.3	0.7	0.1	0.7	1.3
M4	WW-12-0702	-26A	0.2	0.4	0.7	0.0	0.6	1.3
M5	WW-12-0703	-27A	0.1	0.3	0.7	2.0	1.0	1.0
M6	WW-12-0704	-28A	0.4	0.5	0.7	1.0	0.9	1.3
N1	WW-12-0705	-29A	- 0.1	0.3	0.7	0.1	0.7	1.3
N2	WW-12-0706	-30A	0.1	0.3	0.7	- 0.1	0.6	1.3
N3	WW-12-0707	-31A	0.1	0.3	0.7	0.1	0.7	1.3
N4	WW-12-0708	-32A	- 0.1	0.3	0.7	1.1	0.9	1.3

Building 599, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
N5	WW-12-0709	12240-33A	0.5	0.6	0.7	1.0	1.0	1.0
N6	WW-12-0710	-34A	0.4	0.5	0.7	1.0	0.9	1.3
O1	WW-12-0711	-35A	- 0.1	0.3	0.7	- 0.1	0.6	1.3
O2	WW-12-0712	-36A	0.1	0.3	0.7	0.0	0.6	1.3
O3	WW-12-0713	-37A	- 0.1	0.3	0.7	- 0.4	0.5	1.3
O4	WW-12-0714	-38A	- 0.1	0.3	0.7	0.6	0.8	1.3
O5	WW-12-0715	-39A	0.1	0.3	0.7	0.3	0.7	1.3
O6	WW-12-0716	-40A	- 0.1	0.3	0.7	- 0.7	0.4	1.3
P1	WW-12-0717	-41A	- 0.1	0.3	0.7	0.2	0.7	1.3
P2	WW-12-0718	-42A	0.1	0.3	0.7	0.2	0.7	1.3
P3	WW-12-0719	-43A	0.1	0.3	0.7	- 0.3	0.5	1.3
P4	WW-12-0720	-44A	0.1	0.3	0.7	0.1	0.7	1.3
P5	WW-12-0721	-45A	0.1	0.3	0.7	0.1	0.7	1.3
P6	WW-12-0722	-46A	0.1	0.3	0.7	0.2	0.7	1.3
Q1	WW-12-0723	-47A	- 0.1	0.3	0.7	0.4	0.7	1.3
Q2	WW-12-0724	-48A	- 0.1	0.3	0.7	0.2	0.7	1.3
Q3	WW-12-0725	-49A	- 0.1	0.3	0.7	0.8	0.8	1.3
Q4	WW-12-0726	-50A	0.2	0.4	0.7	- 0.1	0.6	1.3
Q5	WW-12-0727	-51A	0.4	0.5	0.7	0.9	0.9	1.3
Q6	WW-12-0728	-52A	- 0.1	0.3	0.7	0.1	0.7	1.3

Building 1100

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
A1	WW-12-1035	12206-01A	0.2	0.4	0.8	2.0	1.0	1.0
A3	WW-12-1036	-02A	0.2	0.4	0.8	2.0	1.0	1.0
A5	WW-12-1037	-03A	0.3	0.5	0.7	2.0	1.0	1.0
B2	WW-12-1038	-04A	0.1	0.3	0.7	0.5	0.8	1.4
B4	WW-12-1039	-05A	0.1	0.3	0.8	2.0	1.0	1.0
B6	WW-12-1040	-06A	- 0.1	0.3	0.8	0.2	0.7	1.4
C1	WW-12-1041	-07A	0.3	0.5	0.7	0.9	0.9	1.4
C3	WW-12-1042	-08A	0.5	0.6	0.7	0.9	0.9	1.4
C5	WW-12-1043	-09A	0.5	0.6	0.8	2.0	1.0	1.0
D2	WW-12-1044	-10A	0.2	0.4	0.8	1.0	0.9	1.4
D4	WW-12-1045	-11A	0.3	0.5	0.7	3.0	1.0	1.0
D6	WW-12-1046	-12A	0.2	0.4	0.7	1.0	1.0	1.0
E1	WW-12-1047	-13A	0.2	0.4	0.8	1.0	1.0	1.0
E3	WW-12-1048	-14A	0.5	0.6	0.8	1.0	0.9	1.4
E5	WW-12-1049	-15A	0.6	0.6	0.7	2.0	1.0	1.0
F2	WW-12-1050	-16A	0.6	0.6	0.7	0.8	0.9	1.4
F4	WW-12-1051	-17A	0.6	0.6	0.8	4.0	1.0	1.0
F6	WW-12-1052	-18A	0.3	0.5	0.8	1.1	0.9	1.4
G1	WW-12-1053	-19A	0.5	0.6	0.7	1.1	0.9	1.4
G3	WW-12-1054	-20A	0.1	0.3	0.7	1.0	1.0	1.0
G5	WW-12-1055	-21A	0.6	0.6	0.8	2.0	1.0	1.0
H2	WW-12-1056	-22A	0.3	0.5	0.8	2.0	1.0	1.0
H4	WW-12-1057	-23A	0.3	0.5	0.7	1.0	1.0	1.0
H6	WW-12-1058	-24A	0.2	0.4	0.7	0.5	0.8	1.4
I1	WW-12-1059	-25A	0.5	0.6	0.8	1.1	0.9	1.4
I3	WW-12-1060	-26A	0.2	0.4	0.8	1.0	1.0	1.0
I5	WW-12-1061	-27A	0.8	0.7	0.7	0.9	0.9	1.4
J2	WW-12-1062	-28A	0.3	0.5	0.7	2.0	1.0	1.0
J4	WW-12-1063	-29A	0.2	0.4	0.8	0.6	0.8	1.4
J6	WW-12-1064	-30A	0.1	0.3	0.8	0.3	0.7	1.4
K1	WW-12-1065	-31A	0.2	0.4	0.7	0.6	0.8	1.4
K3	WW-12-1066	-32A	0.3	0.5	0.7	1.1	0.9	1.4
K5	WW-12-1067	-33A	0.3	0.5	0.8	2.0	1.0	1.0
L2	WW-12-1068	-34A	0.2	0.4	0.8	2.0	1.0	1.0
L4	WW-12-1069	-35A	0.2	0.4	0.7	0.9	0.9	1.4
L6	WW-12-1070	-36A	0.1	0.3	0.7	0.4	0.8	1.4
M1	WW-12-1071	-37A	0.3	0.5	0.8	2.0	1.0	1.0
M3	WW-12-1072	-38A	- 0.1	0.3	0.8	2.0	1.0	1.0
M5	WW-12-1073	-39A	0.5	0.6	0.7	1.0	1.0	1.0
N2	WW-12-1074	-40A	0.5	0.6	0.7	2.0	1.0	1.0
N4	WW-12-1075	-41A	0.3	0.5	0.8	2.0	1.0	1.0

Building 1100, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S12-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
N6	WW-12-1076	12206-42A	0.5	0.6	0.8	0.9	0.9	1.4
O1	WW-12-1077	-43A	0.1	0.3	0.7	2.0	1.0	1.0
O3	WW-12-1078	-44A	0.1	0.3	0.7	1.0	0.9	1.4
O5	WW-12-1079	-45A	- 0.1	0.3	0.8	2.0	1.0	1.0
P2	WW-12-1080	-46A	0.5	0.6	0.8	0.4	0.8	1.4
P4	WW-12-1081	-47A	- 0.1	0.3	0.7	1.0	1.0	1.0
P6	WW-12-1082	-48A	- 0.1	0.3	0.7	0.5	0.8	1.4
Q1	WW-12-1083	-49A	0.1	0.3	0.8	0.3	0.7	1.4
Q3	WW-12-1084	-50A	0.2	0.4	0.8	0.3	0.7	1.4
Q5	WW-12-1085	-51A	- 0.1	0.3	0.7	0.2	0.7	1.4

Building 1101

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S13-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
A1	WW-12-1086	01004-01A	0.1	0.3	0.7	2.0	1.0	1.0
A3	WW-12-1087	-02A	0.2	0.4	0.7	0.4	0.7	1.3
A5	WW-12-1088	-03A	0.4	0.5	0.7	1.0	0.9	1.3
B2	WW-12-1089	-04A	0.8	0.7	0.7	2.0	1.0	1.0
B4	WW-12-1090	-05A	- 0.1	0.3	0.7	1.2	0.9	1.3
B6	WW-12-1091	-06A	- 0.1	0.3	0.7	0.4	0.7	1.3
C1	WW-12-1092	-07A	0.9	0.7	0.7	1.0	1.0	1.0
C3	WW-12-1093	-08A	0.2	0.4	0.7	0.8	0.8	1.3
C5	WW-12-1094	-09A	0.2	0.4	0.7	2.0	1.0	1.0
D2	WW-12-1095	-10A	- 0.1	0.33	0.7	1.0	0.9	1.3
D4	WW-12-1096	-11A	0.1	0.3	0.7	0.8	0.8	1.3
D6	WW-12-1097	-12A	0.5	0.6	0.7	0.9	0.9	1.3
E1	WW-12-1098	-13A	0.5	0.6	0.7	1.0	1.0	1.0
E3	WW-12-1099	-14A	- 0.1	0.3	0.7	0.9	0.9	1.3
E5	WW-12-1100	-15A	0.4	0.5	0.7	0.5	0.8	1.3
F2	WW-12-1101	-16A	0.8	0.7	0.7	2.0	1.0	1.0
F4	WW-12-1102	-17A	0.1	0.1	0.2	0.8	0.5	0.6
F6	WW-12-1103	-18A	0.1	0.1	0.2	0.0	0.3	0.6
G1	WW-12-1104	-19A	0.1	0.1	0.2	0.0	0.3	0.6
G3	WW-12-1105	-20A	0.02	0.09	0.23	0.2	0.3	0.6
G5	WW-12-1106	-21A	0.2	0.2	0.2	0.3	0.4	0.6
H2	WW-12-1107	-22A	0.2	0.2	0.2	0.7	0.5	0.6
H4	WW-12-1108	-23A	0.1	0.1	0.2	0.2	0.3	0.6
H6	WW-12-1109	-24A	0.02	0.09	0.23	0.1	0.3	0.6
I1	WW-12-1110	-25A	0.1	0.1	0.2	0.2	0.3	0.6
I3	WW-12-1111	-26A	0.02	0.09	0.23	0.5	0.4	0.6
I5	WW-12-1112	-27A	0.3	0.2	0.2	- 0.1	0.3	0.6
J2	WW-12-1113	-28A	0.02	0.09	0.23	0.4	0.4	0.6
J4	WW-12-1114	-29A	0.7	0.6	0.7	1.0	1.0	1.0
J6	WW-12-1115	-30A	- 0.1	0.3	0.7	0.7	0.8	1.3
K1	WW-12-1116	-31A	0.1	0.3	0.7	1.1	0.9	1.3
K3	WW-12-1117	-32A	0.1	0.3	0.7	0.4	0.7	1.3
K5	WW-12-1118	-33A	0.5	0.6	0.7	0.7	0.8	1.3
L2	WW-12-1119	-34A	0.7	0.6	0.7	1.0	0.9	1.3
L4	WW-12-1120	-35A	0.5	0.6	0.7	0.6	0.8	1.3
L6	WW-12-1121	-36A	0.4	0.5	0.7	0.4	0.7	1.3
M1	WW-12-1122	-37A	0.5	0.6	0.7	1.2	0.9	1.3
M3	WW-12-1123	-38A	0.2	0.4	0.7	2.0	1.0	1.0
M5	WW-12-1124	-39A	0.5	0.6	0.7	1.2	0.9	1.3
N2	WW-12-1125	-40A	0.4	0.5	0.7	2.0	1.0	1.0
N4	WW-12-1126	-41A	0.2	0.4	0.7	0.8	0.8	1.3

Building 1101, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S13-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
N6	WW-12-1127	01004-42A	0.2	0.4	0.7	0.5	0.8	1.3
O1	WW-12-1128	-43A	0.1	0.3	0.7	0.8	0.8	1.3
O3	WW-12-1129	-44A	0.5	0.6	0.7	0.6	0.8	1.3
O5	WW-12-1130	-45A	0.8	0.7	0.7	0.8	0.8	1.3
P2	WW-12-1131	-46A	0.7	0.6	0.7	0.0	0.6	1.3
P4	WW-12-1132	-47A	0.5	0.6	0.7	1.0	1.0	1.0
P6	WW-12-1133	-48A	0.1	0.3	0.7	2.0	1.0	1.0
Q1	WW-12-1134	-49A	0.4	0.5	0.7	1.1	0.9	1.3
Q3	WW-12-1135	-50A	0.1	0.3	0.7	1.0	1.0	1.0
Q5	WW-12-1136	-51A	0.5	0.6	0.7	1.0	0.9	1.3

Building 1102

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S13-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
A1	WW-12-1137	01011-01A	- 0.1	0.3	0.7	1.0	0.9	1.3
A3	WW-12-1138	-02A	0.2	0.4	0.7	0.0	0.6	1.3
A5	WW-12-1139	-03A	- 0.1	0.3	0.7	0.5	0.8	1.3
B2	WW-12-1140	-04A	0.2	0.4	0.7	0.0	0.6	1.3
B4	WW-12-1141	-05A	0.4	0.5	0.7	2.0	1.0	1.0
B6	WW-12-1142	-06A	0.4	0.5	0.7	0.5	0.8	1.3
C1	WW-12-1143	-07A	0.1	0.3	0.7	0.4	0.7	1.3
C3	WW-12-1144	-08A	0.4	0.5	0.7	0.9	0.9	1.3
C5	WW-12-1145	-09A	0.7	0.6	0.7	2.0	1.0	1.0
D2	WW-12-1146	-10A	0.8	0.7	0.7	0.1	0.7	1.3
D4	WW-12-1147	-11A	0.8	0.7	0.7	1.2	0.9	1.3
D6	WW-12-1148	-12A	0.8	0.7	1.0	0.8	0.7	0.7
E1	WW-12-1149	-13A	0.1	0.3	0.7	0.5	0.8	1.3
E3	WW-12-1150	-14A	0.7	0.6	0.7	2.0	1.0	1.0
E5	WW-12-1151	-15A	0.9	0.7	0.7	0.7	0.8	1.3
F2	WW-12-1152	-16A	0.8	0.7	0.7	1.0	1.0	1.0
F4	WW-12-1153	-17A	0.2	0.4	0.7	2.0	1.0	1.0
F6	WW-12-1154	-18A	- 0.1	0.3	0.7	1.1	0.9	1.3
G1	WW-12-1155	-19A	0.5	0.6	0.7	1.0	1.0	1.0
G3	WW-12-1156	-20A	0.4	0.5	0.7	3.0	1.0	1.0
G5	WW-12-1157	-21A	0.5	0.6	0.7	2.0	1.0	1.0
H2	WW-12-1158	-22A	0.5	0.6	0.7	2.0	1.0	1.0
H4	WW-12-1159	-23A	1.1	0.8	0.7	2.0	1.0	1.0
H6	WW-12-1160	-24A	0.1	0.3	0.7	- 0.1	0.6	1.3
I1	WW-12-1161	-25A	1.2	0.9	0.7	2.0	1.0	1.0
I3	WW-12-1162	-26A	0.2	0.4	0.7	1.0	1.0	1.0
I5	WW-12-1163	-27A	4.0	2.0	1.0	3.0	1.0	1.0
J2	WW-12-1164	-28A	0.1	0.3	0.7	1.0	1.0	1.0
J4	WW-12-1165	-29A	0.5	0.6	0.7	2.0	1.0	1.0
J6	WW-12-1166	-30A	0.2	0.4	0.7	0.8	0.8	1.3
K1	WW-12-1167	-31A	0.2	0.4	0.7	1.0	1.0	1.0
K3	WW-12-1168	-32A	1.1	0.8	0.7	0.9	0.9	1.3
K5	WW-12-1169	-33A	0.8	0.7	0.7	1.0	0.9	1.3
L2	WW-12-1170	-34A	0.5	0.6	0.7	0.9	0.9	1.3
L4	WW-12-1171	-35A	0.8	0.7	0.7	0.8	0.8	1.3
L6	WW-12-1172	-36A	0.4	0.7	1.3	0.1	0.3	0.7
M1	WW-12-1173	-37A	1.4	0.9	0.7	2.0	1.0	1.0
M3	WW-12-1174	-38A	0.9	0.8	0.7	2.0	1.0	1.0
M5	WW-12-1175	-39A	0.9	0.7	0.7	0.8	0.8	1.3
N2	WW-12-1176	-40A	0.1	0.3	0.7	2.0	1.0	1.0
N4	WW-12-1177	-41A	1.1	0.8	0.7	2.0	1.0	1.0

Building 1102, Continued

Location & Identification			Activity per Wipe (pCi) – 300-cm^2 Sampling Area					
Cell	Identification Numbers		α-Radiation			β-Radiation		
	Project	Lab (S13-	Value	Uncertainty	MDA	Value	Uncertainty	MDA
N6	WW-12-1178	01011-42A	1.1	0.8	0.7	0.9	0.9	1.3
O1	WW-12-1179	-43A	0.2	0.4	0.7	0.7	0.8	1.3
O3	WW-12-1180	-44A	0.6	0.6	0.7	1.0	1.0	1.0
O5	WW-12-1181	-45A	0.9	0.8	0.7	2.0	1.0	1.0
P2	WW-12-1182	-46A	0.7	0.6	0.7	0.7	0.8	1.3
P4	WW-12-1183	-47A	0.6	0.6	0.7	2.0	1.0	1.0
P6	WW-12-1184	-48A	0.2	0.4	0.7	0.4	0.7	1.3
Q1	WW-12-1185	-49A	0.4	0.5	0.7	2.0	1.0	1.0
Q3	WW-12-1186	-50A	1.1	0.8	0.7	2.0	1.0	1.0
Q5	WW-12-1187	-51A	0.1	0.3	0.7	2.0	1.0	1.0

Isotopic Uranium Analysis of Composited Wipe Samples

Bulding Number	Sample ID	Activity (pCi per composited wipes)						Average Activity Concentration (dpm/100 cm^2) for Composited Wipes			
		U-234		U-235		U-238					
		Value	Error	Value	Error	Value	Error	U-234	U-235	U-238	Total
584	S1305082-01A	0.995	0.206	0.0483	0.0467	1.18	0.23	0.0072	0.0004	0.0086	0.0161
585	S1305082-02A	5.01	0.711	0.138	0.793	0.442	0.131	0.0363	0.001	0.0032	0.0405
586	S1305082-03A	1.18	0.238	0.0466	0.0466	1.29	0.253	0.0086	0.0003	0.0094	0.0182
587	S1305082-04A	0.942	0.204	0.0713	0.0571	1.51	0.278	0.0068	0.0005	0.0109	0.0183
595	S1305082-05A	1.24	0.249	0.0474	0.0473	1.25	0.25	0.009	0.0003	0.0091	0.0184
597	S1305082-06A	0.758	0.186	0.0556	0.0538	0.826	0.196	0.0055	0.0004	0.006	0.0119
598	S1305082-07A	0.979	0.209	0.0657	0.0537	1.47	0.273	0.0071	0.0005	0.0107	0.0182
599	S1305082-08A	0.896	0.204	0.0622	0.0528	0.873	0.2	0.0065	0.0005	0.0063	0.0133

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Attachment 5
Survey Layout for Building 585, A-Structure

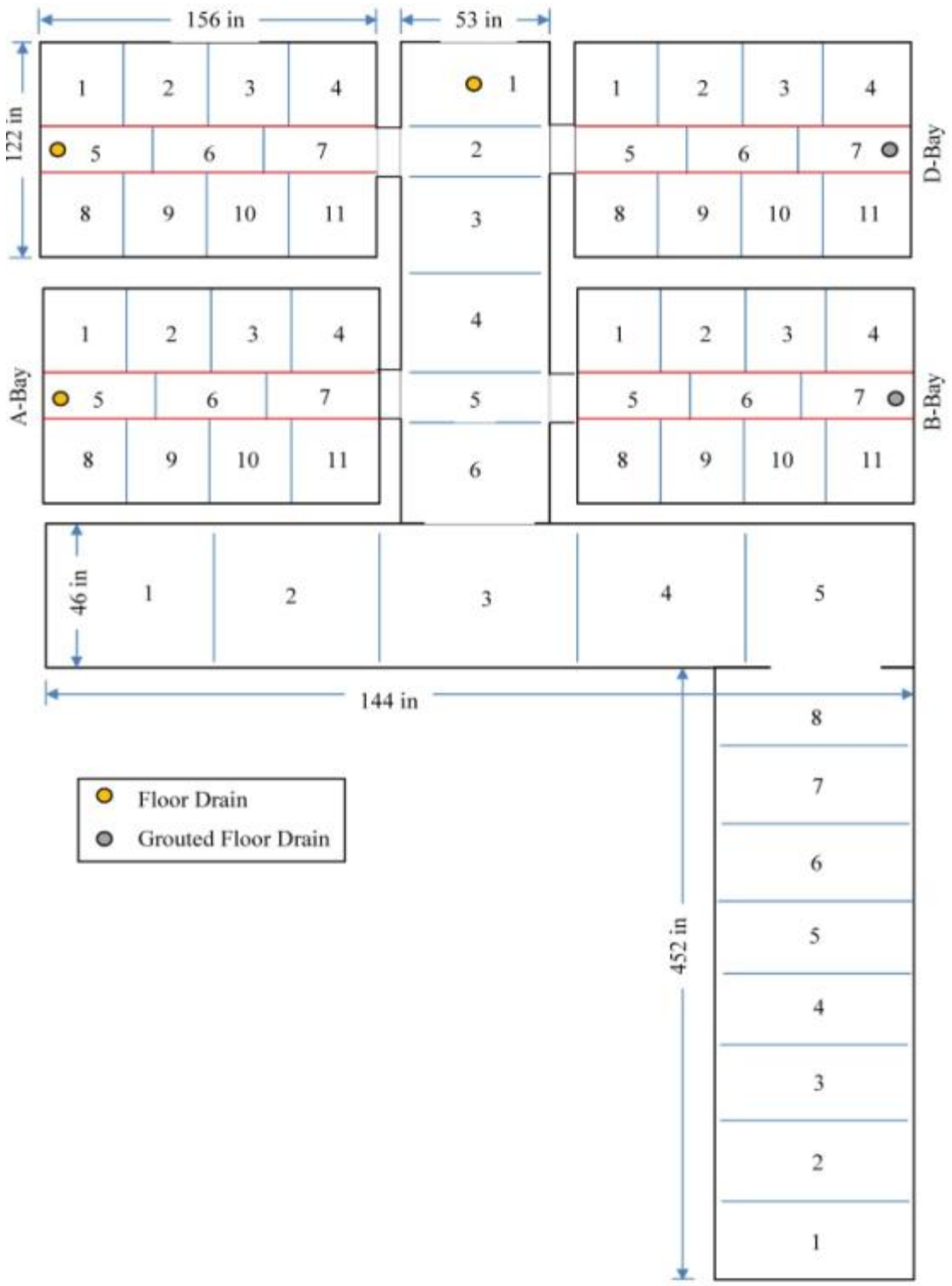

Figure 5-1. Cell Layout for Floor Scanning Survey of Building 586, A-Structure

Attachment 6
Survey Results for Building 585, A-Structure

Table 6-1. In-Situ Scanning Results, Cell Areas, and Wipe Sample Lab Numbers

Area	Survey Cell Number	In-Situ Measurement (1-minute)		Approximate Area (ft^2)	Wipe Sample	
		α (counts)	β (counts)		Code	Lab Number
Bay A	1	4	230	12.5 per cell	A1	WW-12-0103
	2	2	257		A2	WW-12-0104
	3	3	211		A3	WW-12-0105
	4	5	188		A4	WW-12-0106
	5	4	198	10.5 per cell	A5	WW-12-0107
	6	5	209		A6	WW-12-0108
	7	3	178		A7	WW-12-0109
	8	7	228	12.5 per cell	A8	WW-12-0110
	9	13	216		A9	WW-12-0111
	10	3	190		A10	WW-12-0112
	11	3	221		A11	WW-12-0113
	Average	4.7	211.5	NA	NA	NA
	St. Dev.	3.1	22.6			
Bay B	1	3	204	12.5 per cell	B1	WW-12-0114
	2	1	184		B2	WW-12-0115
	3	5	231		B3	WW-12-0116
	4	10	222		B4	WW-12-0117
	5	6	200	10.5 per cell	B5	WW-12-0118
	6	2	222		B6	WW-12-0119
	7	6	207		B7	WW-12-0120
	8	7	239	12.5 per cell	B8	WW-12-0121
	9	6	223		B9	WW-12-0122
	10	3	223		B10	WW-12-0123
	11	7	236		B11	WW-12-0124
	Average	5.1	217	NA	NA	NA
	St. Dev.	2.6	16.8			
Bay C	1	4	245	12.5 per cell	C1	WW-12-0125
	2	5	218		C2	WW-12-0126
	3	9	240		C3	WW-12-0127
	4	11	249		C4	WW-12-0128
	5	5	186	10.5 per cell	C5	WW-12-0129
	6	6	199		C6	WW-12-0130
	7	12	246		C7	WW-12-0131
	8	8	241	12.5 per cell	C8	WW-12-0132
	9	6	215		C9	WW-12-0133
	10	4	213		C10	WW-12-0134
	11	9	259		C11	WW-12-0135
	Average	7.2	228	NA	NA	NA
	St. Dev.	2.8	23.3			

Area	Survey Cell Number	In-Situ Measurement (1-minute)		Approximate Area (ft^2)	Wipe Sample	
		α (counts)	β (counts)		Code	Lab Number
Bay D	1	4	211	12.5 per cell	D1	WW-12-0136
	2	6	204		D2	WW-12-0137
	3	5	241		D3	WW-12-0138
	4	3	214		D4	WW-12-0139
	5	12	232	10.5 per cell	D5	WW-12-0140
	6	5	172		D6	WW-12-0141
	7	10	250		D7	WW-12-0142
	8	3	233	12.5 per cell	D8	WW-12-0143
	9	3	252		D9	WW-12-0144
	10	6	214		D10	WW-12-0145
	11	4	223		D11	WW-12-0146
	Average	5.5	222.4	NA	NA	NA
	St. Dev.	2.9	23.1			
Vault Hallway	1	7	205	17	VH1	WW-12-0147
	2	2	188	11	VH2	WW-12-0148
	3	9	196	21	VH3	WW-12-0149
	4	6	202	21	VH4	WW-12-0150
	5	8	226	11	VH5	WW-12-0151
	6	4	186	21	VH6	WW-12-0152
	Average	6.0	200.5	NA	NA	NA
	St. Dev.	2.6	14.6			
Traverse Hallway	1	8	188	9.2 per cell	TH1	WW-12-0153
	2	2	186		TH2	WW-12-0154
	3	5	210		TH3	WW-12-0155
	4	6	195		TH4	WW-12-0156
	5	2	212		TH5	WW-12-0157
	Average	4.6	198.2	NA	NA	NA
	St. Dev.	2.6	12.2			
Long Entrance Hallway	1	7	323	28.25 per cell	LH1	WW-12-0158
	2	14	309		LH2	WW-12-0159
	3	7	303		LH3	WW-12-0160
	4	3	264		LH4	WW-12-0161
	5	6	225		LH5	WW-12-0162
	6	4	292		LH6	WW-12-0163
	7	3	201		LH7	WW-12-0164
	8	3	226		LH8	WW-12-0165
	Average	5.9	267.9	NA	NA	NA
	St. Dev.	3.7	45.7			
Drains	Hall	1	128	0.8	D	WW-12-0166
	Bay A	1	134	0.8	NA	NA
	Bay B	1	152	0.8	NA	NA

Table 6-2. Wipe Results

Bay	A		B		C		D	
Cell Number	Activity (pCi)		Activity (pCi)		Activity (pCi)		Activity (pCi)	
	α	β	α	β	α	β	α	β
1	0.5 ± 0.6	1.0 ± 0.9	2.0 ± 1.0	3.0 ± 1.0	0.9 ± 0.7	2.0 ± 1.0	1.1 ± 0.8	4.0 ± 1.0
2	1.4 ± 0.9	2.0 ± 1.0	1.0 ± 0.7	3.0 ± 1.0	2.0 ± 1.0	4.0 ± 1.0	0.6 ± 0.6	2.0 ± 1.0
3	0.7 ± 0.6	1.1 ± 0.9	1.4 ± 0.9	2.0 ± 1.0	0.8 ± 0.7	2.0 ± 1.0	0.4 ± 0.5	0.4 ± 0.7
4	1.4 ± 0.9	1.0 ± 1.0	1.3 ± 0.9	2.0 ± 1.0	0.1 ± 0.3	1.0 ± 1.0	2.0 ± 1.0	2.0 ± 1.0
5	0.8 ± 0.7	0.8 ± 0.8	0.4 ± 0.5	0.2 ± 0.7	0.7 ± 0.6	0.8 ± 0.8	0.7 ± 0.6	0.5 ± 0.8
6	0.7 ± 0.6	0.9 ± 0.9	1.4 ± 0.9	1.2 ± 0.9	0.9 ± 0.7	0.3 ± 0.7	0.7 ± 0.6	0.4 ± 0.7
7	0.3 ± 0.4	0.6 ± 0.8	2.0 ± 1.0	2.0 ± 1.0	1.1 ± 0.8	2.0 ± 1.0	1.0 ± 0.8	0.7 ± 0.8
8	0.9 ± 0.7	2.0 ± 1.0	0.7 ± 0.6	2.0 ± 1.0	1.0 ± 0.7	2.0 ± 1.0	1.0 ± 0.7	3.0 ± 1.0
9	0.1 ± 0.3	0.5 ± 0.8	0.3 ± 0.4	2.0 ± 1.0	1.6 ± 0.9	2.0 ± 1.0	0.7 ± 0.6	0.0 ± 0.6
10	0.4 ± 0.5	1.2 ± 0.9	1.1 ± 0.8	3.0 ± 1.0	0.4 ± 0.5	2.0 ± 1.0	1.4 ± 0.9	1.1 ± 0.9
11	0.7 ± 0.6	0.7 ± 0.8	1.3 ± 0.8	2.0 ± 1.0	0.4 ± 0.5	0.9 ± 0.9	1.0 ± 0.8	2.0 ± 1.0

Vault Hallway			Traverse Hallway			Long Entrance Hallway		
Cell Number	Activity (pCi)		Cell Number	Activity (pCi)		Cell Number	Activity (pCi)	
	α	β		α	β		α	β
1	1.4 ± 0.9	2.0 ± 1.0	1	0.9 ± 0.7	3.0 ± 1.0	1	0.3 ± 0.4	-0.1 ±0.6
2	0.5 ± 0.6	0.7 ± 0.8	2	0.6 ± 0.6	1.0 ± 0.9	2	0.5 ± 0.6	0.6 ± 0.8
3	0.4 ± 0.5	0.9 ± 0.9	3	0.3 ± 0.4	1.1 ± 0.9	3	0.5 ± 06	0.1 ± 0.7
4	0.7 ± 0.6	0.1 ± 0.7	4	0.7 ± 0.6	0.9 ± 0.9	4	0.6 ± 0.6	2.0 ± 1.0
5	0.8 ± 0.7	1.0 ± 1.0	5	0.4 ± 0.5	2.0 ± 1.0	5	0.7 ± 0.6	6.0 ± 2.0
6	0.5 ± 0.6	1.0 ± 1.0				6	1.0 ± 0.7	2.0 ± 1.0
						7	0.5 ± 0.6	2.0 ± 1.0
						8	0.3 ± 0.4	2.0 ± 1.0

Hallway Drain	
Activity (pCi)	
α	β
0.4 ± 0.5	0.8 ± 0.8

Attachment 7
Soil and Debris γ-Spectroscopy Analytical Results

		Activity Concentration (pCi/g)											
		584				585				586			
		Floor Debris		External Soil		Floor Debris		External Soil		Floor Debris		External Soil	
		Value	Uncertainty	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty
U-235		0.23	0.06	0.083	0.011	0.09	0.05			0.29	0.08	0.070	0.012
U-238 Progeny	Th-234	8.3	3.4	8.5	0.9	9	9			8.5	8.2	3.0	1.2
	Pa-234m			12.6	5.7								
Am-241		-0.04	0.01	-0.003	0.054	-0.09	0.20			-0.3	0.3	0.012	0.053
Th-232 Series	Ac-228	0.53	0.11	0.68	0.03	0.67	0.09			0.39	0.13	0.71	0.03
	Pb-212	0.65	0.06	0.74	0.03	0.88	0.15			0.53	0.16	0.73	0.02
	Tl-208	0.20	0.06	0.224	0.014	0.25	0.03			0.19	0.05	0.231	0.012
Ra-226 Series	Pb-214	0.53	0.06	0.56	0.03	0.74	0.09			0.50	0.13	0.56	0.02
	Bi-214	0.43	0.07	0.47	0.02	0.60	0.07			0.43	0.09	0.52	0.02
K-40		13.4	1.1	10.0	0.5	16.2	1.2			17.2	1.2	10.4	0.5
Cs-137		0.23	0.04	0.1848	0.0096	0.13	0.03					0.19	0.02
Project Identication No.		GD120001		GS120001		GD120002				GD120003		GS120003	
Lab Identification No.		S1301055-01A		S1301055-02A		S1301057-01A				S1301058-01A		S1301058-02A	

		Activity Concentration (pCi/g)											
		587				588				589			
		Floor Debris		External Soil		Floor Debris		External Soil		Floor Debris		External Soil	
		Value	Uncertainty	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty
U-235		0.2	0.2	0.068	0.011	0.09	0.06	0.090	0.013	0.067	0.011	0.074	0.010
U-238 Progeny	Th-234	23	22	4	2	5	6	3.5	0.8	2.7	0.7	2.7	0.6
	Pa-234m			5	4					4.5	4.9		
Am-241		-0.5	0.7	0.016	0.049	0.00	0.23	0.006	0.041	0.04	0.06	0.004	0.049
Th-232 Series	Ac-228	0.7	0.4	0.58	0.03	0.36	0.15	0.91	0.03	0.50	0.03	0.72	0.03
	Pb-212	0.7	0.2	0.64	0.02	0.6	0.6	0.87	0.03	0.63	0.02	0.76	0.02
	Tl-208			0.19	0.01	0.11	0.06	0.28	0.13	0.187	0.011	0.226	0.012
Ra-226 Series	Pb-214	1.1	0.3	0.57	0.03	0.50	0.08	0.66	0.03	0.48	0.03	0.71	0.03
	Bi-214	0.9	0.3	0.50	0.02	0.34	0.08	0.60	0.02	0.47	0.03	0.61	0.02
K-40		15	3	9.1	0.4	42	2	14.2	0.7	15.8	0.7	9.5	0.5
Cs-137		0.09	0.08	0.437	0.018	0.087	0.031	0.074	0.011	0.241	0.014	0.143	0.018
Project Identication No.		GD120004		GS120004		GD120005		GS120005		GD120006		GS120006	
Lab Identification No.		S1301059-01A		S1301059-02A		S1301060-01A		S1301060-02A		S1301061-01A		S1301061-02A	

		Activity Concentration (pCi/g)											
		590				595				596			
		Floor Debris		External Soil		Floor Debris		External Soil		Floor Debris		External Soil	
		Value	Uncertainty	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty
U-235		0.09	0.06	0.085	0.011	0.26	0.07	0.094	0.013	0.31	0.08	0.11	0.02
U-238 Progeny	Th-234	4.3	2.3	3.88	0.06	4	4	4.3	0.7	6.1	4.7	2.7	0.7
	Pa-234m			4.3	4.4			4	4				
Am-241		0.15	0.14	-0.004	0.054	0.05	0.25	-0.02	0.06	0.06	0.27	-0.06	0.06
Th-232 Series	Ac-228	0.58	0.14	0.75	0.02	0.65	0.11	0.94	0.03	0.72	0.14	1.12	0.04
	Pb-212	0.67	0.07	0.79	0.04	0.46	0.10	0.93	0.03	0.60	0.08	1.08	0.04
	Tl-208	0.16	0.05	0.239	0.012	0.13	0.05	0.309	0.013	0.12	0.05	0.35	0.02
Ra-226 Series	Pb-214	0.67	0.10	0.64	0.03	0.59	0.10	0.67	0.02	0.58	0.10	0.80	0.03
	Bi-214	0.57	0.11	0.56	0.02	0.55	0.09	0.62	0.02	0.73	0.11	0.71	0.03
K-40		14.3	1.2	11.9	0.6	40	2	12.8	0.6	14.0	1.3	15.1	0.7
Cs-137		0.34	0.08	0.089	0.007	0.13	0.04	0.19	0.02	0.33	0.05	0.20	0.02
Project Identication No.		GD120007		GS120007		GD120008		GS120008		GD120009		GS120009	
Lab Identification No.		S1301062-01A		S1301062-02A		S1301063-01A		S1301063-02A		S1301064-01A		S1301064-02A	

		Activity Concentration (pCi/g)											
		597				598				599			
		Floor Debris		External Soil		Floor Debris		External Soil		Floor Debris		Floor Debris	
		Value	Uncertainty	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty
U-235		0.27	0.08	0.093	0.012	0.080	0.014	0.084	0.012	0.104	0.016	0.096	0.011
U-238 Progeny	Th-234	43	11	11.2	0.99	6.6	1.1	4.2	0.9	6	2	4.1	1.5
	Pa-234m			7.0	6.9			4.7	5.5			8.6	7.5
Am-241		-0.2	0.3	-0.02	0.06	-0.002	0.070	-0.15	0.05	0.02	0.07	0.002	0.054
Th-232 Series	Ac-228	0.44	0.14	0.80	0.03	0.71	0.04	0.86	0.03	0.81	0.03	0.73	0.03
	Pb-212	0.56	0.08	0.85	0.03	0.83	0.03	0.88	0.02	0.96	0.03	0.69	0.04
	Tl-208			0.264	0.012	0.241	0.019	0.271	0.012	0.289	0.016	0.229	0.013
Ra-226 Series	Pb-214	0.65	0.08	0.65	0.02	0.68	0.03	0.71	0.03	0.72	0.03	0.79	0.02
	Bi-214	0.67	0.10	0.578	0.025	0.62	0.03	0.66	0.02	0.62	0.03	0.71	0.03
K-40		15.1	1.3	11.7	0.6	30.9	1.4	11.8	0.6	26.5	1.2	11.8	0.6
Cs-137		0.33	0.05	0.29	0.02	0.154	0.013	0.131	0.008	0.114	0.009	0.082	0.006
Project Identication No.		GD120010		GS120010		GD120011		GS120011		GD120012		GS120012	
Lab Identification No.		S1301065-01A		S1301065-02A		S1301077-01A		S1301077-02A		S1301078-01A		S1301078-02A	

		Activity Concentration (pCi/g)											
		1100				1101				1102			
		Floor Debris		External Soil		Floor Debris		External Soil		Floor Debris		External Soil	
		Value	Uncertainty	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty	Value	Uncertainty
U-235		0.10	0.06	0.05	0.04	0.11	0.06	0.090	0.017	0.19	0.12	0.087	0.012
U-238 Progeny	Th-234	9	7	2.55	0.09	8.6	4.8	5.9	1.0	26	20	3.8	1
	Pa-234m											7	8
Am-241		0.15	0.21	-0.02	0.06	-0.05	0.25	0.03	0.05	-0.019	0.053	-0.002	0.056
Th-232 Series	Ac-228	0.82	0.11	0.86	0.03	0.61	0.14	0.78	0.03	1.0	0.4	0.76	0.03
	Pb-212	0.75	0.12	0.87	0.02	0.57	0.15	0.87	0.11	0.69	0.18	0.89	0.09
	Tl-208	0.28	0.05	0.273	0.012	0.21	0.05	0.238	0.012	0.31	0.10	0.255	0.013
Ra-226 Series	Pb-214	0.83	0.07	0.67	0.02	0.83	0.09	0.71	0.03	0.61	0.18	0.64	0.02
	Bi-214	0.72	0.08	0.63	0.02	0.74	0.09	0.61	0.02	0.60	0.17	0.60	0.02
K-40		25.0	1.6	12.0	0.6	23.8	1.7	13.0	0.6	22	3	13.1	0.6
Cs-137		0.16	0.04	0.140	0.011	0.47	0.06	0.114	0.008	0.28	0.10	0.22	0.02
Project Identication No.		GD120013		GS120013		GD120014		GS120014		GD120015		GS120015	
Lab Identification No.		S1301079-01A		S1301079-02A		S1301080-01A		S1301080-02A		S1301081-01A		S1301081-02A	

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Attachment 8
Equipment Calibration Sheets

COPY

Pg 1 of 3

DEPARTMENT OF THE AIR FORCE
USAF SCHOOL OF AEROSPACE MEDICINE (AFMC)
OCCUPATIONAL ENVIRONMENTAL HEALTH/RADIATION HEALTH (OEHH)
WRIGHT-PATTERSON AFB OHIO

CERTIFICATE OF CALIBRATION

Mfg. Ludlum Model 2224-1 Serial # 127836 Index # 5914 Date: 25 Oct 12
Mfg. Ludlum Model 43-37-1 Serial # 143637 Index # N/A Cal. Due Date: 25 Oct 13

TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT

NIST Traceable Check Sources

Isotope	*Serial #*	*Cert. Date*	*EPM*
See Pgs 2 & 3			

Reference Instruments

Mfg.	*Model*	*Serial #*	*Cal. Due Date*
Ludlum	**500-1**	**102951**	**14 Feb 2013**

Measurement Standards and test equipment used are traceable to the National Institute of Standards and Technology, to the extent allowed by the Institute's calibration facilities.

☑ Battery Ck. ☑ Mechanical Ck. ☑ Meter Zeroed ☑ Reset Ck. NA Alarm Ck.
☑ Audio Ck. ☑ Geotropism Ck. NA F/S Resp. Ck. ☑ Window Op.

As Found HV 1594 VDC Temperature 68.1 °F Relative Humidity 54.7 %

Volt. Set 1600 V Beta Threshold 3.5 mV Beta Window 30 mV Alpha Threshold 120 mV

HV Readout (2 points) Reference: 500 V Inst. Readout: 500 V ± 2%
Reference: 1500 V Inst. Readout: 1502 V ± 2%

RANGE MULTIPLIER	REFERENCE CAL. POINT	"AS FOUND" READING	CORRECTED READING
x 1000	400 CPM	400000 CPM	400000 CPM
x 1000	100 CPM	100000 CPM	100000 CPM
x 100	400 CPM	40000 CPM	40000 CPM
x 100	100 CPM	10000 CPM	10000 CPM
x 10	400 CPM	4000 CPM	4000 CPM
x 10	100 CPM	1000 CPM	1000 CPM
x 1	400 CPM	400 CPM	400 CPM
x 1	100 CPM	100 CPM	100 CPM

DIGITAL SCALER READOUT

CAL. REF. POINT	AS FOUND READING	CORRECTED READING
40,000 CPM	40055 CPM	40055 CPM

*UNCERTAINTY WITHIN ± 10% CORRECTION FACTOR WITHIN ± 20%

COMMENTS: Calibration Interval = 1 year
EPM=2π Emission Rate per Min
Detector Parameters on Pgs 2 & 3 **Procedural Authority - ICP#22244389**

Calibrated By: [signature] Date: 25 Oct 12
Reviewed By: [signature] Date: 1 Nov 12

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DEPARTMENT OF THE AIR FORCE
USAF SCHOOL OF AEROSPACE MEDICINE (AFMC)
OCCUPATIONAL ENVIRONMENTAL HEALTH/RADIATION HEALTH (OEHH)
WRIGHT-PATTERSON AFB OHIO

CERTIFICATE OF CALIBRATION

Mfg. Ludlum Model 2224-1 Serial # 127836 Index # 5914 Date: 25 Oct '12
Mfg. Ludlum Model 43-37-1 Serial # 143637 Index # N/A Cal. Due Date: 25 Oct '13

As Found HV 1594 VDC Alpha Threshold 120 mV Beta Threshold 3.5 mV
Count Time 60 sec. Distance from Source to Detector 1/4 in. Beta Window 30 mV

TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT

NIST Traceable Check Sources

Isotope	Serial #	Cert. Date	DPM
Am-241	MU857	30 Sep '04	21441
Tc-99	MU858	28 Sep '04	29752

Reference Instruments

Mfg.	Model	Serial #	Cal. Due Date
Ludlum	500-1	102952	14 Feb '13

Measurement Standards and test equipment used are traceable to the National Institute of Standards and Technology, to the extent allowed by the Institute calibration facilities.

HIGH VOLTAGE DETERMINATION

High Voltage	Background		Source - Am-241		Source - Tc-99		Source -		Source -	
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
800	0	0	0	0	0	0				
850	0	0	0	0	0	0				
900	0	0	0	0	0	0				
950	0	0	0	3	0	0				
1000	0	1	0	2498	0	0				
1050	0	2	0	7543	0	1				
1100	0	6	0	9841	0	6				
1150	0	3	0	10040	0	4				
1200	0	8	0	10024	0	9				
1250	0	4	0	10393	0	5				
1300	0	5	0	7376	0	5				
1350	0	3	0	4509	0	3				
1400	0	3	1	2354	0	132				
1450	0	36	487	1545	1	1116				
1500	0	94	2697	3706	2	3747				
1550	1	179	4406	1715	1	6595				
> 1600	1	295	5772	2328	1	9386				
1650	4	514	6851	3035	3	11888				
1700	4	949	8197	3681	3	13397				
1750	8	1356	8698	4065	78	11972				
1800	30	1329	9430	3631	740	8279				

Final High Voltage Setting 1600

brated By: Matthew Latourette Date: 25 Oct '12
iewed By: [signature] Date: 1 Nov 12

DEPARTMENT OF THE AIR FORCE
AIR FORCE INSTITUTE FOR OPERATIONAL HEALTH (AFMC)
RADIATION SURVEILLANCE DIVISION (SDR)
WRIGHT-PATTERSON AFB OHIO

CERTIFICATE OF CALIBRATION

Mfg. Ludlum Model 2224-1 Serial # 127836 Index # 5714 Date: 25 Oct '12
Mfg. Ludlum Model 43-37-1 Serial # 143637 Index # N/A Cal. Due Date: 25 Oct '13

TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT

NIST Traceable Check Sources

Isotope	Serial #	Cert. Date	DPM
Tc-99	MU 858	28 Sep'04	29752
Am-241	MU 860	30 Sep'04	30088
Cs-137	MU 848	30 Sep'04	28,945
Pu-239	RP 880	2 May '89	3,217

Reference Instruments

Mfg.	Model	Serial #	Cal. Due Date
Ludlum	500-1	102951	14 Feb '13

Measurement Standards and test equipment used are traceable to the National Institute of Standards and Technology, to the extent allowed by the Institute calibration facilities.

DETECTOR UNIFORMITY AND EFFICIENCY

	Source - β Tc-99		Source - β Cs-137		Source - α Am-241		Source - α Pu-239	
Source Location	29752	DPM	28945	DPM	30088	DPM	3217	DPM
Position 1	9193	CPM	4580	CPM	3949	CPM	425	CPM
Position 2	9331	CPM	4134	CPM	4122	CPM	408	CPM
Position 3	9406	CPM	5918	CPM	4469	CPM	412	CPM
Position 4	9511	CPM	5998	CPM	4666	CPM	427	CPM
Position 5	9553	CPM	5885	CPM	4661	CPM	421	CPM
Position 6	9459	CPM	5592	CPM	4890	CPM	409	CPM
Position 7	9043	CPM	4752	CPM	3203	CPM	404	CPM
Position 8	9259	CPM	4458	CPM	3903	CPM	423	CPM
Average	9344	CPM	5165	CPM	4194.8	CPM	416.1	CPM
2Π Effeciency	30.4	%	19.0	%	14.0	%	13.0	%

EFFICIENCY = ((GCPM– BCPM)÷ DPM) × 100%

Front

1	3	5	7
2	4	6	8

Back

COMMENTS: Calibration Interval = 1 year
EPM=2π Emission Rate per Min
Surface Area of Detector: 425 Active area cm^2

Calibrated By: [signature] Date: 25 Oct '12
Reviewed By: [signature] Date: 26 Oct 12

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CERTIFICATE OF CALIBRATION

Mfg. Ludlum Model 2360 Serial # 278626 Index # 102117 Date: 28Mar12
Mfg. Ludlum Model 43-89 Serial # PR311680 Index # / Cal. Due Date: 28Mar13

TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT

NIST Traceable Check Sources

Isotope	*Serial #*	*Cert. Date*	*EPM*
Am-241	RP3076	30 Sep 04	21,459
Tc-99	RP3073	28 Sep 04	29,753

Reference Instruments

Mfg.	*Model*	*Serial #*	*Cal. Due Date*
Ludlum	**500-1**	**102951**	**14 Feb 2013**

Measurement Standards and test equipment used are traceable to the National Institute of Standards and Technology, to the extent allowed by the Institute's calibration facilities.

☑ Battery Ck. ☑ Mechanical Ck. ☑ Meter Zeroed ☑ Reset Ck. NA Alarm Ck.
☑ Audio Ck. ☑ Geotropism Ck. NA F/S Resp. Ck. ☑ Window Op.

As Found HV 729 VDC Temperature 68.5 °F Relative Humidity 55.2 %

Volt. Set 815 V Beta Threshold 3.5 mV Beta Window 30 mV Alpha Threshold 120 mV

HV Readout (2 points) Reference: 500 V Reference: 1000 V
Inst. Readout: 500 V ± 2% Inst. Readout: 1,000 V ± 2%

RANGE MULTIPLIER	REFERENCE CAL. POINT	"AS FOUND" READING		CORRECTED READING	
x 1000	400 CPM	400,000	CPM	400,000	CPM
x 1000	100 CPM	100,000	CPM	100,000	CPM
x 100	400 CPM	40,000	CPM	40,000	CPM
x 100	100 CPM	10,000	CPM	10,000	CPM
x 10	400 CPM	4,000	CPM	4,000	CPM
x 10	100 CPM	1,000	CPM	1,000	CPM
x 1	400 CPM	400	CPM	400	CPM
x 1	100 CPM	100	CPM	100	CPM

DIGITAL SCALER READOUT

CAL. REF. POINT	AS FOUND READING		CORRECTED READING	
40,000 CPM	39,975	CPM	39,975	CPM

*UNCERTAINTY WITHIN ± 10% CORRECTION FACTOR WITHIN ± 20%

COMMENTS: Calibration Interval = 1 year
EPM=2π Emission Rate per Min
α Eff: 42.8 % 2π@1/4"
β Eff: 29.0 % 2π@1/4" **Procedural Authority - ICP#23604389**

Calibrated By: Stu Hutchinson Date: 28 Mar 2012
Reviewed By: Date: 18 Apr 12

DEPARTMENT OF THE AIR FORCE
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CERTIFICATE OF CALIBRATION

Mfg. Ludlum Model 2360 Serial # 278626 Index # 102117 Date: 28 Mar 12
Mfg. Ludlum Model 43-89 Serial # PR311680 Index # ____ Cal. Due Date: 28 Mar 13

As Found High Voltage 729 VDC Alpha Input Sensitivity 120 mV
Beta Input Sensitivity 3.5 mV Window 30 mV

Count Time 60 sec. Distance from Source to Detector 1/4" in.

TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT

NIST Traceable Check Sources

Isotope	*Serial #*	*Cert. Date*	*EPM*
Am-241	RP3076	30 Sep 04	21,459
Tc-99	RP3073	28 Sep 04	29,753

Reference Instruments

Mfg.	*Model*	*Serial #*	*Cal. Due Date*
Ludlum	**500-1**	**102951**	**14 Feb 2013**

Measurement Standards and test equipment used are traceable to the National Institute of Standards and Technology, to the extent allowed by the Institute's calibration facilities.

HIGH VOLTAGE DETERMINATION

High Voltage	*Background*		*Alpha Source*		*Alpha CrossTalk*		*Beta Source*		*Beta CrossTalk*	
	Alpha	*Beta*	*Alpha*	*Beta*	*cross talk*	*% eff.*	*Alpha*	*Beta*	*cross talk*	*% eff.*
765	0	134	8705	486	4.0	40.1	0	6361	0.00	20.9
790	0	177	9081	616	4.8	41.8	0	7971	0.00	26.2
815	0	191	9101	942	8.3	41.9	1	8809	0.01	29.0
840	1	199	9395	1686	15.8	43.3	2	9861	0.01	32.5
865	1	194	9465	3577	35.7	43.6	4	10776	0.03	35.6

Final High Voltage Setting 815 VDC

DETECTOR UNIFORMITY AND EFFICIENCY

Source Location	Alpha Source EPM	Beta Source EPM	Other EPM
Heel	9468 CPM	9240 CPM	CPM
Center	9101 CPM	8809 CPM	CPM
Toe	8958 CPM	8386 CPM	CPM
Average	9175.7 CPM	8811.7 CPM	CPM
Instrument Effeciency	42.8 %	29.0 %	%

EFFICIENCY = ((GCPM– BCPM)÷ EPM) × 100%

COMMENTS: Calibration Interval = 1 year
EPM=2π Emission Rate per Min
Surface Area of Detector: 125 Active area cm^2

Calibrated By: Stu Hutchinson _____ Date: 28 Mar 2012
Reviewed By: _____ Date: 15 March

DEPARTMENT OF THE AIR FORCE
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CERTIFICATE OF CALIBRATION

Mfg. Ludlum Model 2360 Serial # 287540 Index # 102114 Date: 28 Mar 12
Mfg. Ludlum Model 43-89 Serial # PR311679 Index # ——— Cal. Due Date: 28 Mar 13

TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT

NIST Traceable Check Sources

Isotope	*Serial #*	*Cert. Date*	*EPM*
Am-241	RP3076	30 Sep 04	21,459
Tc-99	RP3073	28 Sep 04	29,753

Reference Instruments

Mfg.	*Model*	*Serial #*	*Cal. Due Date*
Ludlum	**500-1**	**102951**	**14 Feb 2013**

Measurement Standards and test equipment used are traceable to the National Institute of Standards and Technology, to the extent allowed by the Institute's calibration facilities.

☑ Battery Ck. ☑ Mechanical Ck. ☑ Meter Zeroed ☑ Reset Ck. NA Alarm Ck.
☑ Audio Ck. ☑ Geotropism Ck. NA F/S Resp. Ck. ☑ Window Op.

As Found HV 628 VDC Temperature 69.7 °F Relative Humidity 56.4 %

Volt. Set 660 V Beta Threshold 3.5 mV Beta Window 30 mV Alpha Threshold 120 mV

HV Readout (2 points) Reference: 500 V Reference: 1000 V
Inst. Readout: 500 V ± 2% Inst. Readout: 1000 V ± 2%

RANGE MULTIPLIER	REFERENCE CAL. POINT	"AS FOUND" READING	CORRECTED READING
x 1000	400 CPM	400,000 CPM	400,000 CPM
x 1000	100 CPM	100,000 CPM	100,000 CPM
x 100	400 CPM	40,000 CPM	40,000 CPM
x 100	100 CPM	10,000 CPM	10,000 CPM
x 10	400 CPM	4,000 CPM	4,000 CPM
x 10	100 CPM	1,000 CPM	1,000 CPM
x 1	400 CPM	400 CPM	400 CPM
x 1	100 CPM	100 CPM	100 CPM

DIGITAL SCALER READOUT

CAL. REF. POINT	AS FOUND READING	CORRECTED READING
40,000 CPM	39,977 CPM	39,977 CPM

*UNCERTAINTY WITHIN ± 10% CORRECTION FACTOR WITHIN ± 20%

COMMENTS: Calibration Interval = 1 year
EPM=2π Emission Rate per Min
α Eff: 43.3 % 2π@1/4"
β Eff: 26.2 % 2π@1/4" **Procedural Authority - ICP#23604389**

Calibrated By: Stu Hutchinson Date: 28 Mar 2012
Reviewed By: [signature] Date: 18 Apr 12

DEPARTMENT OF THE AIR FORCE
USAF SCHOOL OF AEROSPACE MEDICINE (AFMC)
OCCUPATIONAL ENVIRONMENTAL HEALTH/RADIATION HEALTH (OEHH)
WRIGHT-PATTERSON AFB OHIO

CERTIFICATE OF CALIBRATION

Mfg. Ludlum Model 2360 Serial # 287540 Index # 102114 Date: 28 Mar 12
Mfg. Ludlum Model 43-89 Serial # R311679 Index # ____ Cal. Due Date: 28 Mar 13

As Found High Voltage 628 VDC Alpha Input Sensitivity 120 mV
Beta Input Sensitivity 3.5 mV Window 30 mV

Count Time 60 sec. Distance from Source to Detector 1/4" in.

TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT

NIST Traceable Check Sources

Isotope	*Serial #*	*Cert. Date*	*EPM*
Am-241	RP3076	30 Sep 04	21,459
Tc-99	RP3073	28 Sep 04	29,753

Reference Instruments

Mfg.	*Model*	*Serial #*	*Cal. Due Date*
Ludlum	**500-1**	**102951**	**14 Feb 2013**

Measurement Standards and test equipment used are traceable to the National Institute of Standards and Technology, to the extent allowed by the Institute's calibration facilities.

HIGH VOLTAGE DETERMINATION

High Voltage	*Background*		*Alpha Source*		*Alpha CrossTalk*		*Beta Source*		*Beta CrossTalk*	
	Alpha	*Beta*	*Alpha*	*Beta*	*cross talk*	*% eff.*	*Alpha*	*Beta*	*cross talk*	*% eff.*
610	0	76	7932	413	4.2	36.5	0	4472	0.00	14.8
635	0	114	8799	490	4.3	40.5	0	6135	0.00	20.2
660	1	199	9216	692	5.3	42.4	0	7981	-0.01	26.1
685	0	186	9499	1,464	13.5	43.7	0	9300	0.00	30.6
710	0	212	9571	4057	40.2	44.1	0	10406	0.00	34.3

Final High Voltage Setting 660 VDC

DETECTOR UNIFORMITY AND EFFICIENCY

Source Location	Alpha Source EPM	Beta Source EPM	Other EPM
Heel	9407 CPM	8681 CPM	CPM
Center	9216 CPM	7981 CPM	CPM
Toe	9280 CPM	7282 CPM	CPM
Average	9301 CPM	7981.3 CPM	CPM
Instrument Effeciency	43.3 %	26.2 %	%

EFFICIENCY = ((GCPM– BCPM)÷ EPM) × 100%

COMMENTS: Calibration Interval = 1 year
EPM=2π Emission Rate per Min
Surface Area of Detector: 125 Active area cm^2

Calibrated By: Stu Hutchinson Date: 28 Mar 2012
Reviewed By: P. Wells Date: 18 Apr 12